Site Permit Application

Faribault Energy Park, LLC

Faribault Energy Park, LLC

Faribault, Minnesota

September 2003

Table of Contents

FIGURES

APPENDICES

Executive Summary

The Faribault Energy Park, LLC (FEP) is proposing to design, construct, and operate a nominal 250 megawatt (MW) combined cycle power plant and appurtenant facilities including an electrical transmission interconnect and a natural gas pipeline tap and extension on a property located on the west side of Highway 76 and south of 170th Street West in Faribault, Minnesota. This will be referred to hereinafter as the Project.

Need for the Project

Minnesota Municipal Power Agency (MMPA), the owner of FEP, has compared future projected power needs versus contracted capacity and has identified a growing shortfall, project to be 113 MW by Year 2006, and 216 MW by year 2011. In addition, a significant shortfall in generation capacity has been projected in the Mid-Continent Area Power Pool (MAPP), with few new generation projects currently being planned for the MAPP region. As a result, the nominal 250 MW combined cycle power plant will meet the MMPA's capacity needs as well as the needs of MAPP.

Engineering and Operational Design

The Faribault Energy Park Combined Cycle Plant is proposed to be built on a 37-acre site in the northern portion of the City of Faribault, Minnesota, between Interstate Highway 35 and State Aid Highway 76. It is designed as a "one-on-one" type of multi-shaft combined cycle power plant, comprised of one gas turbine/generator and one steam turbine/generator. Each turbine drives an electrical generator to produce electricity. This is a typical combined cycle design that is widely used within the industry, and is well proven in service. Natural gas fuel will be used by the gas turbine, resulting in minimal environmental impact. The hot turbine exhaust gas will be used to produce steam for the steam turbine, thus maximizing conversion of fuel energy into electricity. State of the art equipment from experienced suppliers will be used. This equipment is highly reliable, and the gas turbine's capability to operate at low emission levels while using natural gas fuel is environmentally friendly. Selective catalytic reduction (SCR) will also be incorporated into the heat recovery steam generator (HRSG) to further reduce nitrogen oxide (NO_x) emissions at the stack.

Key performance design objectives for the Project include maximum power output during peak summer periods while maintaining high efficiency at base load operation, and to maximize efficiency for a range of operating conditions without increasing emissions. To accomplish this, the Faribault Energy Park plant will include combustion turbine (CT) inlet cooling. This will provide increased power output capability on hot days when CT output is otherwise reduced because of high ambient temperature. For periods of load reduction such as at night or on weekends, the combustion turbine is capable of reducing load by as much as 40 percent without increasing emissions.

Cost Analysis

Detailed engineering and cost estimation has not been completed at this time. Faribault Energy Park expects the capital cost of the facility to be about $150 million.

Summary of the Project

This Site Permit Application has been developed in accordance with applicable MEQB requirements. The Minnesota Public Utilities Commission (PUC) has approved a Certificate of Need (CON) for the Project on July 10, 2003 (PUC Docket No.: IP6202/CN-02-2006).

The applicant has evaluated two alternative sites in accordance with MEQB guidance, further delineated in later text, and has made recommendation of a preferred site. Criteria in favor of choosing the preferred alternative include the following:

- Community Acceptance: The preferred site is farthest away from the nearest residence. It appears the owner of this property may not be receptive to selling his property. Distance from the nearest receptor will enhance community acceptance, so the preferred site is the better choice. The preferred site allows for the construction of a created wetlands and interpretive park, allowing the citizens of the area additional recreational opportunities, making it a more positive alternative.
- Impact on Future Development: The preferred site may allow development that is more practical and consistent with the City of Faribault master plan, so there appears to be some advantage. Construction on the alternate site would require the acquisition of easements across the preferred site, which would result in making the preferred site less appealing for development. In addition, construction on the alternate site would make access to the preferred site more difficult, providing another barrier to future development.
- Economic Effects: The preferred site has similar economic effects on the community to the alternate site, but has lower acquisition and construction-related costs:
  - The preferred site would have lower construction costs for natural gas and electrical interconnection due to its closer location to the natural gas pipeline and the electric transmission lines.
  - The preferred site would not have the requirement for purchasing natural gas pipeline and electric transmission easements, resulting in lower costs than the alternate site.

    - The alternate site would likely require purchasing the property of the nearest receptor and easements across the preferred site, resulting in a higher cost.

- Fogging and Icing Potential: The preferred site is farther West of the prevailing downwind impacted area, State Highway 76, giving it a clear advantage from this standpoint.
- Noise Potential: The preferred site is farther away from the nearest receptor, providing a clear advantage from the noise impact standpoint.
- Natural Gas Availability: Both sites are in near proximity to a major natural gas pipeline, although the preferred site is located closer to the pipeline take point, resulting in lower costs of construction.
- Electrical Transmission: The preferred site is closer to the electrical interconnect point, resulting in lower costs of construction.
- Wastewater Management: The preferred site allows the construction of a created wetlands for tertiary treatment of process wastewater, resulting in less impact to the environment than the alternative site.
- Aesthetics: The preferred site allows for the construction of a created wetlands and interpretive park, allowing the citizens of the area additional recreational opportunities, making it a more positive alternative.

Section 1

Introduction

The MMPA herein presents a Site Permit Application that requests approval for the siting of a nominal 250 megawatt (MW) combined cycle power plant and appurtenant facilities including a transmission interconnect and a natural gas pipeline tap and extension in an area recently annexed by the City of Faribault. The owner of the facility will be referred to as Faribault Energy Park, which is wholly owned by the MMPA. Pending regulatory approval, proposed construction is anticipated to initiate in 2004, and be completed in 2006.

The Mid-Continent Area Power Pool (MAPP) is an association of electric utilities and other electric industry participants. MAPP was organized in 1972 for the purpose of pooling generation and transmission. MAPP is a voluntary association of electric utilities who do business in the Upper Midwest. Its members are investor-owned utilities, cooperatives, municipals, public power districts, a power marketing agency, power marketers, regulatory agencies, and independent power producers. Today, MAPP has 107 members.

The MAPP organization performs three core functions: it is a Reliability Council, responsible for the safety and reliability of the bulk electric system, under the North American Electric Reliability Council (NERC); a regional transmission group, responsible for facilitating open access of the transmission system; and a power and energy market, where MAPP Members and non-members may buy and sell electricity.

MAPP was created to safeguard the region's bulk electric system. One of its main responsibilities is protecting the electric power network, commonly referred to as the grid, in the following states and provinces: Minnesota, Nebraska, North Dakota, Manitoba, Saskatchewan, and parts of Wisconsin, Montana, Iowa, and South Dakota. MAPP also has members in Kansas and Missouri.

A significant shortfall in generation capacity has been projected by MAPP, with few new generation projects currently being planned for the MAPP region. As a result, the nominal

250 MW combined cycle power plant will help meet the MMPA's capacity needs as well as the needs of MAPP.

Power Plant Siting Process

Faribault Energy Park is submitting this Site Permit application to the Minnesota Environmental Quality Board (EQB) for its Faribault Generation Project (Project). The Faribault Energy Park requests that the EQB process this site permit application in accordance with applicable regulatory procedures.

A power plant that operates above 50 MW fired by natural gas as its primary fuel feedstock is subject to the requirements of the Power Plant Siting Act *(Minn. Stat. 116C.51-69)*. The proposed project will result in the construction of a combined cycle, primarily natural gas-fired with supplemental fuel oil, combustion turbine plant with capacity of nominal 250 MW. Therefore, the proposed project is subject to the requirements of the Power Plant Siting Act.

The following is a summary of the permitting process:

- Applicant submits a Site Permit Application to EQB, along with application fee and electronic copy in designated format.
- EQB Chair must accept or reject the application within 10 working days of receipt.
- Within 15 days after submission, applicant provides notice to persons on general list maintained by EQB, to local officials, and adjacent property owners.
- Within 15 days after submission applicant publishes notice in a legal newspaper of general circulation.
- Within 30 days after providing the requisite notice applicant provides documentation of notices to EQB.
- Upon acceptance of an application, the Chair shall schedule an EIS scoping public meeting to be held no later than 60 days after acceptance of application. The EQB shall give at least 10 days prior notice of the public meeting in a location near the proposed project site. Public meeting must be informal and afford an opportunity to comment and ask questions.
- The EQB shall provide a period of at least 7 days from the day of the public meeting for the public to submit comments.
- The EQB chair shall determine the scope of the EIS as soon after the public meeting as possible.
- Within 5 days after reaching the scoping decision, the EQB shall mail notice to those people on the general list, attendees, local officials, and adjacent property owners.
- EQB develops draft EIS.
- Upon completion of the draft EIS EQB publishes notice of its availability in the EQB Monitor and in a legal newspaper of general circulation. EQB also places a copy in the local public library or government office, and posts it on the EQB website.
- The public meeting to discuss the draft EIS will not be held sooner than 20 days after the draft EIS becomes available. The public meeting may be held just prior to the holding of a contested case hearing on the permit application.
- The EQB shall hold the record on the draft EIS open for receipt of written comments for not less than 10 days after the close of the public meeting.

- The EQB shall respond to the timely substantive comments received on the draft EIS consistent with the scoping decision.
- The EQB shall publish notice of the availability of the final EIS.
- The EQB Board shall not decide the adequacy for at least 10 days after the availability of the final EIS.
- The EQB shall hold a contested case hearing after the draft EIS is prepared.
- The Board shall make a final decision on a site permit within 60 days after receipt of the Administrative Law Judge's report.
- The EQB shall publish notice of its decision in the State Register within 30 days of decision.

Site Permit Requirements

The EQB has adopted rules to implement the requirements of the Power Plant Siting Act. These rules are in the process of being amended. The rules are detailed in Minnesota Rules Chapter 4400. The following items are required in the site permit application:

- Statement of Proposed Ownership
- Name of Permittee
- Proposed Alternatives
- Description of the Facility
- Environmental Information
- Owners of Property
- Engineering and Operational Design and Analysis
- Cost Analysis
- Expansion Analysis
- Infrastructure Needs
- List of Required Permits
- Certificate of Need

Section 2

Project Description

Proposed Ownership

The Project will be built and owned and operated by the Faribault Energy Park, which is wholly owned by the MMPA. In May of 1992, the eight cities of Anoka, Arlington, Brownton, Chaska, Le Sueur, North St. Paul, Olivia, and Winthrop signed agreements to form the MMPA. The MMPA took on the responsibility of wholesale power supply for its members. Over the years, MMPA has been able to provide a power supply that allows its members to be very competitive in the Minnesota electric energy market. The Faribault Energy Park will be the lead developer of the project.

Please contact James Larson at Faribault Energy Park for information about this application:

Faribault Energy Park
200 South 6th Street, Suite 300
Minneapolis, MN 55402
Phone: (612) 349-6868
Fax: (612) 349-6108

Proposed Permittee

The Project will be operated by the Faribault Energy Park.

Alternative Sites

In the initial planning stages for the project, the MMPA performed a screening evaluation of potential sites in Minnesota for construction of a new power generating facility. Initial screening criteria for evaluation of these sites included the following:

- Proximity to suitable transmission infrastructure and potential interconnection costs.
- Location of suitable natural gas pipelines in relation to the potential site.
- Magnitude of environmental impacts.

- Community acceptance.
- Availability of useable land.

Following this screening evaluation, the MMPA determined the most appropriate site was in the Faribault area. As a result, the Faribault Energy Park arrived at a potential general geographic location for the facility, located in an area that has been annexed by the City of Faribault for industrial development. EQB requires an evaluation of two alternative sites for development, Locations of sites are presented in Figure 1 – Vicinity Map. The preferred site is located in the southwest ¼ of the northeast ¼ of Section 13, Township 110N, Range 21W. The alternate site is located east-northeast of the preferred site in the general southeast ¼ of the northeast ¼ of Section 13, Township 110N, Range 21W. Presented below is a delineation of the evaluation criteria and a summary of findings. More detailed information on specific areas is presented in the appropriate sections contained within this Site Permit Application.

Specific screening criteria include the following:

- Air
- Land
- Water
- Vegetation
- Land Use
- Municipal Services
- Roads
- Fogging and Icing Potential
- Noise Potential
- Visual Impacts
- Historic Sites
- Economic Effects
- Natural Gas Availability
- Electric Transmission
- Water Supply
- Wastewater Management
- Community Acceptance
- Impact on Future Development
- Aesthetics

Air **-** Although the preferred site is located marginally farther from the nearest receptor, due to engineering controls and the configuration of the emission points in the proposed facility, there should be no significant difference in exposure to receptor populations between the preferred site and the alternative site.

Land **-** Both the evaluated sites are located on land used for agricultural purposes so there appears to be no significant difference in potential to negatively affect land or destroy wetlands. The footprint required for each site is similar, so there is no significant amount of difference in the affect on total land use.

Water **-** Both evaluated sites would withdraw groundwater from the underlying Jordan aquifer, and as such, there is no significant difference in potential to significantly affect other users of the Jordan aquifer adversely.

Vegetation **-** Both proposed sites would be located on land predominantly used for corn/soybean crop rotation, so vegetative impacts appear to be similar. Very little vegetation, if any, would be removed in either construction scenario.

Land Use **-** Both sites remove land from agricultural use. This area of Faribault has been planned to be used for industrial purposes in the master plan for the City of Faribault. There is no significant difference in planned land use between the alternate sites.

Municipal Services **-** Both proposed sites would use limited City of Faribault services, primarily fire and police services. At this time, the engineering design for either site would use a septic system for sanitary waste management, an onsite wastewater treatment plant with created wetlands for tertiary process wastewater treatment at the preferred site only, and groundwater for process and potable water. As such, the initial planning for the project regardless of selected site does not include use of City water or sewer service. There are no significant differences between either proposed site.

Roads **-** The preferred site would require marginal construction of additional roadway for initial construction purposes, although this additional construction would be a very small percentage of the total cost of construction. Without expansion of the current roadway system, both sites would require construction of city streets in accordance with the City of Faribault zoning requirements. Impact to traffic would be similar with either proposed site.

Fogging and Icing Potential **-** The preferred site would be located approximately 400 yards farther West of State Highway 76, so the potential for fogging and icing on the downwind highway would be less at this location than the alternate site. Obviously, the preferred site would be closer to Interstate 35, but since the prevailing wind pattern for the area is dominantly from the West, and the elevation of Interstate 35 is much higher than the primary source of icing and fogging potential (the cooling tower apparatus) the potential of icing and fogging on Interstate 35 is negligible.

Noise Potential **-** The preferred site would be located farther away from the potential receptors, resulting in significantly less noise impact than the alternate site.

Visual Impacts **-** The Faribault Energy Park is a relatively large industrial facility, and as such, visibility from a distance would be similar regardless of whether the facility was located on the preferred site or the alternate site. On the other hand, the preferred site allows the construction of a created wetlands and interpretive educational park with public access. This area would be visually attractive and be an advantage over the alternative site.

Historic Sites - According to the historical, cultural, and archaeological resources study performed, there are no significant differences between the proposed site locations.

Economic Effects - Both proposed sites would have identical economic impacts on the community. The land area requirements of each facility are similar, so the current property owner might be compensated in roughly the same amount, although the alternate site is not currently under an option agreement and this could result in a higher cost of land for the alternate site. Employment projections are identical, so both construction payrolls and operating personnel salaries would be identical. The proposed sites are in near proximity, so they would draw from the same labor pool. There appear to be no significant differences in community economic impact between the proposed sites.

The Project could result in the development of energy-related industry in the immediate area. The Faribault Energy Park has had preliminary discussions with energy-intensive industries about potentially co-locating in the immediate area and purchasing steam from the Project. While these discussions are in the very earliest stages, they illustrate the related economic potential of the Project.

There are significant differences in the economic impact of the locations of the sites to the potential acquisition and construction costs of the Project. The preferred site is located closer to the natural gas source and electrical transmission interconnect, so the costs of construction of these ancillary facilities would be significantly higher, perhaps as much as several hundred thousand dollars. Another cost consideration is the necessity to procure easements for natural gas and electrical transmission across the preferred site. This could make development on the preferred site less appealing. In addition, location of the alternate site would likely result in the necessity to purchase the property of the nearest receptor to mitigate noise impact on the population, resulting in a displacement plus an unknown additional cost in procuring this property.

Natural Gas Availability - . The preferred site would be in closer proximity to the natural gas pipeline, so the construction costs to establish service would be lower. Both proposed sites would draw from the same natural gas pipeline, so there would be no difference in source of primary fuel feedstock In addition, the alternate site would require easements for the pipeline installation and maintenance and almost certainly would remove this area from potential development.

Electric Transmission - The preferred site is located about 400 yards closer to the transmission interconnect point. Preliminary engineering estimates indicate costs of establishing service to the preferred site would be several hundred thousand dollars less expensive than the alternate site. In addition, easements for electrical transmission would be required at the alternate site, resulting in a higher cost. Also, the alternate site would require easements across the preferred site for electrical power line installation and maintenance, and almost certainly would remove this area from potential development.

Water Supply - As indicated earlier, both sites would withdraw the same amount of water from the underlying Jordan aquifer, so there is no difference.

Wastewater Management - At this time, it is anticipated sanitary wastes would be managed by disposal in a permitted septic system at both sites. Process wastewater at the preferred site would be treated in an on-site wastewater treatment system, discharged into created wetlands for tertiary treatment, then outfall to the unnamed tributary. Because of the topographic considerations, wastewater management at the alternate site would consist of treatment in an onsite wastewater treatment system with an outfall to the unknown tributary of the Cannon River. The configuration of the alternate site would not allow the construction of the created wetlands for tertiary treatment. The preferred site is a more positive site from the standpoint of improved water quality and less effect on the natural environment.

Community Acceptance - Based on communication with various individuals and community groups in the area, it appears the construction of the facility in this area has wide community support. Initial contacts with the nearby property owner whose property adjoins the alternate site were not favorable. As a result, Faribault Energy Park anticipates this property owner would object to the alternate site on a variety of grounds. In addition, the Faribault Energy Park has monitored the local press and has detected no opposition to the project, and has encountered no opposition to the location of the Project in this general geographic vicinity. Because of the likely objection of the nearest receptor, the preferred site enjoys more community acceptance than the alternate site.

Impact on Future Development - The preferred site is located on land directly adjacent to Interstate 35, and leaves the potential industrial development of the alternate site open. There is a possibility if the alternate site were the preferred selection, that the preferred site would remain undeveloped due to easement requirements and the awkward layout of the land, which is inconsistent with the City of Faribault master plan. In addition, construction on the alternate site would entail procurement of easements required by the installation of natural gas service and the electrical interconnect directly over the preferred site, making this site less favorable for future development. Therefore, the preferred site is more favorable from the standpoint of future development.

Aesthetics: - The preferred site would allow for the creation of a wetlands for tertiary treatment of process wastewater, which would decrease the impact of the facility in this configuration on water quality in the unnamed tributary. In addition, the Faribault Energy Park plans on developing an interpretive park for public use surrounding this wetlands, which would greatly enhance the aesthetics of the facility. Because of topographic restrictions, the alternative site would not allow this alternative. The preferred site would be more favorable from the aesthetic standpoint.

Recommendations and Conclusion - The preferred site is the obvious choice. The alternate site appears to have no significant advantages, while the preferred site has clear advantages in the following categories:

- Community Acceptance: The preferred site is farthest away from the nearest residence. It appears the owner of this property may not be receptive to selling his property.

Distance from the nearest receptor will enhance community acceptance, so the preferred site is the better choice. The preferred site allows for the construction of a created wetlands and interpretive park, allowing the citizens of the area additional recreational opportunities, making it a more positive alternative.

- Impact on Future Development: The preferred site may allow development that is more practical and consistent with the City of Faribault master plan, so there appears to be some advantage. Construction on the alternate site would require the acquisition of easements, which would result in making that land less appealing for development. In addition, construction on the alternate site would make access to the preferred site more difficult, providing another barrier to future development.

- Economic Effects: The preferred site has similar economic effects on the community to the alternate site, but has lower acquisition and construction-related costs:
  - The preferred site would have lower construction costs for natural gas and electrical interconnection due to its closer location to the natural gas pipeline and electrical transmission lines.
  - The preferred site would not have the requirement for purchasing natural gas pipeline and electrical transmission easements, resulting in lower costs than the alternate site.
  - The alternate site would likely require purchasing the property of the nearest receptor and easements across the preferred site, resulting in a higher cost.
- Fogging and Icing Potential: The preferred site is farther West of the prevailing downwind impacted area, State Highway 76, giving it a clear advantage from this standpoint.
- Noise Potential: The preferred site is farther away from the nearest receptor, providing a clear advantage from the noise impact standpoint.
- Natural Gas Availability: Both sites are in near proximity to a major natural gas pipeline, although the preferred site is located closer to the pipeline take point, resulting in lower costs of construction.
- Electrical Transmission: The preferred site is closer to the electrical interconnect point, resulting in lower costs of construction.
- Wastewater Management: The preferred site allows the construction of a created wetlands for tertiary treatment of process wastewater, resulting in less impact to the environment than the alternative site.
- Aesthetics: The preferred site allows for the construction of a created wetlands and interpretive park, allowing the citizens of the area additional recreational opportunities, making it a more positive alternative.

Description of Proposed Facility

***Size and Type* –** The Project is a state-of-the-art, low capital, dispatchable, natural gas-fired, nominal 250 MW combined cycle intermediate generation facility. It is expected to have an annual availability factor in excess of 90 percent and can be called upon to deliver up to its seasonal peak capacity within 4 hours from a cold start.

***Location* –**The project site is located in Rice County. Figure 1 - Vicinity Map located at the end of this section provides a depiction of the site location. The property to be acquired for the

Project is 37 acres. Figures 3 and 4 - Concept Plan located at the end of this section provides a conceptual layout of the facility on the preferred and alternate sites as well as a depiction of the location. Designations of operational equipment are included in this figure.

Description – Figure 6 - Faribault Energy Park located at the end of this section provides a rendering of the facility depicted on the preferred site as it would appear following construction. The plant footprint will require approximately 12 acres. The base plant design consists of the following major equipment:

- Gas Turbine/Generator
- Steam Turbine/Generator
- Transformers
- Heat Recovery Steam/Generator
- Stack
- Emergency Diesel/Generator
- Fuel Oil Storage Tanks
- Cooling Towers

Transportation, Pipeline, and Electrical Transmission Systems

Major roadways that will be utilized are Highway 76, 170th Street West, and Interstate 35. Depending on exact location of the facility, approximately ½ mile of paving may be needed. The Project is located near the intersection of a major natural gas pipeline and a major electrical transmission line, the Lake Marion – West Faribault 115 kV line. This location was selected so that the Project will provide the most benefits to regional and local area transmission while minimizing the construction of new transmission facilities. Faribault Energy Park is studying two options for the Project's interconnection with the electrical transmission grid. Natural gas will be provided to the plant site by a new 16-inch line off of the Northern Natural Gas mainline. The location of the natural gas transmission line easement is depicted in Figures 3 and 4 at the end of this section. More details on transportation, pipeline, and electrical transmission systems are detailed in the infrastructure needs section.

Staffing

Once in operation, the plant would have approximately 17 full-time employees, including residents of the local community. Approximately 250 construction workers will be utilized in the construction of the project.

Project Schedule

Pending regulatory approval, proposed construction is anticipated to initiate in 2004 and the Project is scheduled to come online in 2006.

Property Owner

The proposed site is currently farmland. Faribault Energy Park currently holds an option for the purchase of the preferred site. The owner of the property is containing both the preferred site and the alternate site is Don Schultz.

Engineering and Operational Design and Analysis

Faribault Energy Park proposes to construct a gas-fired, combined-cycle combustion turbine power generating facility capable of being operated in either base load or intermediate load mode. The Faribault Energy Park proposed project will be a major source of emissions under Prevention of Significant Deterioration (PSD) and Title V of the Clean Air Act. The proposed facility will be significant under PSD for nitrogen oxides (NO_X), carbon monoxide (CO), particulate matter less than ten microns (PM_{10}) and sulfur dioxide (SO_2) and therefore subject to New Source Review for these pollutants.

The following units are anticipated for construction:

- One (1) Combustion Turbine, operating in combined cycle with a Heat Recovery Steam Generator (HRSG), producing a nominal 250 MW. The combustion turbine will control NO_X emissions by use of a Selective Catalytic Reduction (SCR) system. The combustion turbine will be fueled with natural gas. A provision for 2500 hours per year of back-up fuel oil is included in the applicable air permit application. Once procurement has been finalized, manufacturer's specifications will be forwarded to EQB.
- One (1) Auxiliary Boiler with a burner capacity of 40 million Btu's per hour (MMBtu/hr), natural gas fired.
- One (1) 500 kilowatt (kW) Emergency Generator, fuel oil fired.
- One (1) 250 horsepower (hp) Fire Pump Engine.
- One (1) 3.41 million gallon per hour (MMGal/hour) Cooling Tower.

Other facility equipment, such as a fuel oil storage tank, meets the qualifications for an insignificant unit pursuant to Minnesota Rules.

Natural gas is the generic term used for the mixture of vapors that result from the decomposition of plant and animal materials over millions of years. Natural gas, along with oil and coal, is a fossil fuel and, similar to oil and coal, is found in underground reservoirs located in several areas of North America. The primary component of natural gas is methane, a hydrocarbon.

Natural gas is the cleanest of all the fossil fuels. The stock of natural gas, like other fossil-based fuels, is limited and is therefore not a renewable resource. The combustion of natural gas produces only a fraction of the nitrogen oxide and carbon dioxide emissions of oil and coal, and also results in essentially no particulate matter or sulfur dioxide emissions. Natural gas, therefore, becomes an attractive "transition" fuel, as the energy supply moves away from polluting sources such as coal and nuclear sources and towards cleaner, renewable technologies.

Natural gas can be used as a fuel in conventional steam boiler generators, like other fossil fuels. However, new technologies using natural gas as their primary fuel are far more efficient than older combustion technologies. New state-of-the-art combined cycle plants reduce fossil fuel use by as much as 40 percent.

Combined cycle plants are based on the use of combustion turbine technology, where natural gas is burned in the combustion turbine and electricity is produced by a coupled generator. The waste heat created from this combustion process is recovered in a heat recovery steam/generator (HRSG) where high-pressure steam is produced and used to drive a steam turbine/generator to produce additional electrical power. Combined cycle technology is the coupling of two electric generation technologies, and boosts efficiency by using the same fuel to generate electricity twice.

Natural gas creates significantly smaller environmental impacts than coal. On a Btu basis, natural gas combustion generates about half as much carbon dioxide, or CO_2, as coal, less particulate matter, and very little sulfur dioxide or toxic air emissions. Natural gas combustion may, however, produce nitrogen oxides and carbon monoxide in quantities comparable to coal burning. Ongoing use of natural gas inevitably results in methane emissions, a very potent greenhouse gas contributing to global climate change. Natural gas drilling and exploration can negatively impact wilderness habitat, wildlife, and public open space. Among the list of potential negative land impacts associated with natural gas are erosion, loss of soil productivity, increased runoffs, landslides and flooding.

If natural gas is compared to coal combustion, CO_2 emissions are significantly reduced, but natural gas combustion still results in a net increase in CO_2 emissions and therefore can contribute to climate change.

Gas plant operations may result in significant impacts on water resources, depending on the type of combustion technology and plant design. Combined cycle power plants do have a steam-cooling phase that may require significant quantities of water, but far less per unit of energy than coal plants.

In a combined-cycle power plant, both combustion and steam turbine/generators are used to supply power to the grid. The use of the steam cycle increases the efficiency of the power plant by generating electricity from waste heat that would have otherwise been discharged into the environment from the combustion turbine.

A combustion turbine typically has three major components: (1) a compressor, (2) a combustion chamber, (3) and a turbine. Air is drawn into the compressor, compressed, and discharged to the combustion chamber. The compressed air is injected with fuel in the combustion chamber and hot gases are sent to the turbine where the gas expands over the turbine blades, causing them to rotate. The rotating blades turn a shaft connected to a generator that produces electricity.

In a combined-cycle generator, the hot air exiting the combustion turbine is routed to a HRSG that extracts the heat used in the steam cycle. The waste heat of the combustion turbine can be used in the steam cycle because the gas cycle operates at temperatures in the range of 2,000° to 3,000°F, while the steam cycle operates at temperatures in the range of 1,000° to 1,200°F. The HRSG supplies steam to the high- and low-pressure steam turbines for additional work, and waste heat is removed from the steam in the condenser after it leaves the low-pressure steam turbine.

At the Faribault Energy Park, heat removed from the steam passing through the condenser will be dissipated using cooling towers. To illustrate the efficiencies of this system, the heat emitted from the cooling towers is expected to be one-fourth to one-third of the heat emitted from a coal-fired power plant with similar megawatt capacity to the plant that is proposed. The footprint of the proposed Faribault Energy Park facility is less than half of a coal facility with comparable generation capacity. Two primary reasons are:

- Storage of the natural gas fuel is not necessary while a coal plant must have a coal pile nearby.
- A HRSG requires much less area than a conventional boiler.

The steam cycle utilizes six major components: (1) the steam drum (or steam generator) fed from tubes in the turbine exhaust passage, (2) an economizer, (3) the superheater, (4) the steam turbine, (5) a condenser, (6) and the feed water heater. The source of heat for the economizer, superheater, and steam drum is the exhaust gas of the combustion turbine. The source of heat for the feedwater heater is steam bled off of the high-pressure portion of the steam turbine. Water from the condenser is pumped to the feedwater heater and then to the economizer. Heat is added to the water by each of these in order for the water to be at the correct inlet temperature for the steam drum. In the steam drum the water is converted to steam. From the steam drum, the steam goes to the superheater. In the superheater, additional energy, in the form of heat, is added to the steam. The steam exiting the superheater is sent to the high-pressure steam turbine and then to the low-pressure steam turbine. The steam exits the low-pressure steam turbine to the condenser.

Steam exiting a steam turbine is condensed into liquid form prior to being pumped back to the HRSG. The steam is turned to liquid through the removal of heat by the condenser. The heat removed by the condenser would be released into the environment using cooling towers. The water exiting the condenser is pumped to the top of the tower and then cascades to the bottom of the tower through packing media. Air is drawn from outside the tower through the packing media, where heat and moisture are transferred to it from the cascading water. The moist, warm air leaving the packing media exits out the top of the tower. The air exiting the top of the tower is typically invisible during warm weather. In colder weather, the air exiting the cooling tower can become a visible plume if the ambient air temperature causes the air leaving the tower to cool below its dew point. The plume persists until the air exiting the tower sufficiently mixes with the cooler, dryer air surrounding the tower.

The Faribault Energy Park facility is expected to be in the range of 56 percent efficient, depending on operating conditions. In comparison, the existing base-load coal plants in the Midwest typically have an overall efficiency of approximately 30 percent. The combustion turbine would use approximately 35 to 38 percent of the energy from the natural gas fuel to produce electricity. The remaining energy would become heat exhausted to the HRSG. The HRSG would transfer approximately 45 percent of the energy from the combustion turbine into steam, similar to that of a conventional plant. About 20 percent of the total energy would be exhausted up the stack from the HRSG. Steam from the HRSG would drive a turbine to convert an additional 17 percent of the total energy input into electricity. This would boost the overall plant efficiency to the aforementioned approximate 56 percent. The remaining 25 to 30 percent of total heat input would be emitted to the atmosphere through the cooling towers.

Engineering and operational controls for emission reduction/management include a Selective Catalytic Reduction (SCR) for NO_x control. In general, SCR is a post combustion control technology that involved ammonia injection to control and manage NO_x emissions. Ammonia injection at the Faribault unit is anticipated to be aqueous ammonia, which will be stored on site in above ground storage tanks. It is anticipated a 19 percent ammonia solution will be used at the facility. Advantages to aqueous ammonia include ease of storage and safety in management on site.

The theory of reducing flame temperature provides one mechanism of thermal NOX control. The first efforts to lower NOX emissions by controlling flame temperature were directed toward designing a combustor with a leaner reaction zone whereby excess air is diverted to the flame end, which reduces the flame temperature. Leaning out the flame zone also reduces the flame length and thus reduces the residence time a gas molecule spends at NOX formation temperatures. This approach, however, is limited because of the large turndown in fuel flow (40 to 1), airflow (30 to 1) and fuel/air ratio (5 to 1; whereas stoichiometric equivalence is approximately 10 to 1). In practice, these factors limit lean combustion technology to actual reductions of 15% to 40% in NOX emissions.

The power output level of a gas turbine is directly related to the firing temperature – higher firing temperatures yield higher overall thermodynamic efficiency. A more efficient turbine requires less fuel for combustion, thereby reducing its overall products of combustion including NOX. This creates a dichotomy in design when attempting to optimize for low NOX emissions. Until more recently, improving efficiency through higher temperature firing had been limited by the ability of the equipment to sustain operations in the higher temperature zones required for increased efficiency in fuel consumption. Cracking, flexing, and deformation of fillets, rotors, and subassembly bolts are examples of design problems that have been observed when attempting to do so. Recently, CT manufacturers have overcome these failure modes, whereby higher firing temperatures and optimized pressure ratios have become practical. The resulting thermal efficiency gains have sufficiently reduced the fuel usage needs for combustion and, along with other gains in lean combustion technology and post-combustion cooling, offset the additional thermal NOX formation associated with higher temperatures. The representative CT anticipated for this project operates with Dry Low NO_x (DLN) combustion when firing natural gas and can achieve a 25 ppmv NOX emission rate utilizing its DLN technology.

DLN and water/steam injection are mutually exclusive. It is envisioned DLN technology will be used when firing on natural gas, and steam/water injection when firing on fuel oil.

Another approach to reducing the flame temperature (and thereby NOX formation) is by introducing a heat sink into the flame zone. Both water and steam have been effective at achieving this goal. In general, for a given NOX reduction, approximately 1.6 times as much steam as water (on a mass basis) is required for control. However, there is a penalty in turbine efficiency, as more fuel is required to heat the water to combustion temperature. Obviously, there are practical limits with injecting water or steam. Foremost is that increased water / steam injection will eventually lead to a blow out of the flame. Moreover, dynamic pressure activity increases from water/steam injection, which results in increased internal vibratory pressures on the combustion hardware. These pressures place increasing loads on the equipment leading to decreased equipment life and, if high enough, failure. As such, the lowest practical NOX level achieved with water/steam injection is generally 25 – 40 ppmv when firing with natural gas and

40 – 55 ppmv when firing fuel oil. Steam injection is applied with the anticipated turbine when firing fuel oil with an industry standard 42 ppmv NOX concentration in the exhaust.

Water quality information indicates groundwater may be heavily mineralized, so treatment may include pH adjustment, demineralization, and filtration may be required. To enhance operational efficiency of the unit, it is anticipated chilled water will be used in the inlet air cooling system, which will involve limited amounts of chilled water storage at the facility.

Wastewater treatment may be significant because preliminary analysis indicates raw water may be heavily mineralized. Process wastewater from these plants typically is a function of the raw water influent and cycles of concentration. It is anticipated primary treatment will include filtration and secondary treatment would include pH adjustment. Treated process wastewater would then outfall into a created wetlands of several acres for tertiary treatment, prior to final outfall into the unnamed tributary that runs near the preferred site. As discussed earlier, construction of a created wetlands for tertiary treatment on the alternate site does not appear to be feasible. In this case, the treated effluent would be directly discharged under applicable permit into the unnamed tributary to the Cannon River that lies near the alternative site.

At this time, engineering details are dependent on final design of the plant, which will include detailed engineering and evaluation of various equipment alternatives. It is not anticipated that the operational characteristics of the constructed project will vary significantly from information included within this document. At this time, the best estimate is that the combined cycle facility will be nominally 250 MW.

Fuels and Fuel Storage and Staging

It is anticipated that natural gas will be primary fuel used to generate electricity at the power plant. The natural gas would be obtained on a competitive basis from the gas supply market. After metering, the natural gas would flow through a moisture separator and fine filter to remove any particles or dust. The gas would be preheated prior to entering the combustion turbine. Preheating the gas improves the efficiency of the turbine. Fuel use at the facility is a function of temperature and operating characteristics of the unit. It is anticipated at full capacity, the unit would use in the range of two million cubic feet of natural gas per hour when fired on natural gas. When fired on fuel oil, it would use about 14,000 gallons of fuel oil per hour.

Fuel oil may be used as an alternate fuel. Fuel oil may be transported to the facility via truck, and stored onsite in above ground storage vessels sized to provide a 48-hour supply, in order to comply with MAPP requirements. Preliminary engineering design indicates construction will include two (2) 350,000-gallon capacity fuel oil tanks. All fuel oil storage will be subject to Spill Prevention Control and Countermeasure Plan (SPCC) requirements, which require construction of engineering controls and planning for mitigation of possible releases to the environment. Facilities that have more than one million gallons capacity must obtain an individual permit from the Minnesota Pollution Control Agency (MPCA) according to *Minnesota Rules Chapter 7001.4205-4250.* In the event the facility exceeds these threshold limits, it will comply with state requirements. Fuel oil operation is not anticipated to be a frequent occurrence, but has been included as an alternative to ensure the maximum flexibility of the Project.

Fuel oil storage will occur in one central location to mitigate spill risk as well as provide one central spill containment structure.

Operation

Actual operation would depend on market conditions and the market price for natural gas. The assumed capacity factors are in the range of 40 to 90 percent. The combined-cycle plant offers a large efficiency advantage over a conventional simple-cycle plant. The Faribault Energy Park anticipates the plant will have a 30-year life.

Power plant generating facilities can be divided into base load plants, intermediate plants, and peaking plants. Base load plants provide a base level of electricity to the system and are typically large. Historically, nuclear or fossil fuels have powered base load plants. Base load plants tend to be operated continuously except when down for scheduled maintenance or an unplanned (forced) outage. They have a relatively high "capacity factor," typically in the range of 60 percent or greater. The capacity factor is the ratio of the amount of power actually produced in a given period to that which could have been produced if the plant operated at 100 percent power for 100 percent of the time. Lower cost of fuel and higher capacity factor characteristics of base load plants generally result in a low unit cost of power. They are cheaper to run and, as such, are typically run more during any given day than intermediate and peaking plants.

Intermediate plants are typically either older, less efficient plants or newer plants constructed specifically for cyclic operation. They are normally operated only during times of elevated load demand and therefore have a lower capacity factor than base load plants, typically in the 25 to 50 percent range. They are less expensive to build than base load plants.

Peaking plants are designed to provide the additional power needed during peak system demand periods, such as those caused by high air-conditioning loads during summer months. The capacity factor of peaking plants is fairly low, typically less than 15 percent. These plants are more economical to build than base load or intermediate load plants but usually more expensive to run and operate.

Cost Analysis

Detailed engineering and cost estimation has not been completed at this time. Faribault Energy Park expects the capital cost of the facility to be on the order of $150 million, based upon preliminary engineering estimates and evaluation of market conditions. Final construction costs will not be definitely known until the project is awarded to a general construction contractor.

Site Expansion Analysis

Faribault Energy Park will be constructed so it may sell steam or hot water as a byproduct for possible adjacent industry. This would increase the overall efficiency of the facility, as well as fostering potential economic development of industry requiring significant amounts of steam, such as value-added agricultural processing. Although this would enhance the efficiency of the plant, it would not increase the amount of fuel consumed by the plant. This would make the site much more attractive to possible industrial location, and enhance the market value of adjacent land. The preferred site occupies land closer to the periphery of Interstate 35, removing that land from future development, but allowing the alternative site to be developed for other purposes.

This is the best possible configuration for use of land in the area, as development of the alternate site would necessitate easements for natural gas and electrical transmission. These easements would make development significantly less attractive, resulting in the possibility of the preferred site being unutilized. If the alternate site were selected, easements for the placement of high-power transmission lines would be required over the preferred site. It is almost certain this area would not be developed. This would not be congruent with the City of Faribault's planned use of this area.

Because of limited natural gas and electrical transmission capacity limitations, expansion of the facility is extremely unlikely. The facility is designed as a nominal 250 MW CT, and ancillary facilities required for operating this facility are sized for this configuration and support requirements. Engineering design of the facility itself is such that it is unlikely expansion could occur without major retrofitting. Expansion of the Project would be cost prohibitive.

Infrastructure Needs

Transportation

Major roadways that will be utilized during construction and operation are Highway 76, 170th Street West, and Interstate 35. Depending on exact location of the facility, approximately ½ mile of paving may be needed. This paving will be performed in accordance with the City of Faribault's anticipated development of the area as an industrial park.

Rice County Highway Department has indicated that the 2001 average daily traffic for Highway 76 (east of site) is 180 vehicles per day. Traffic counts for other roadways are not available (verbal communication, September 2002). Substantial additional traffic is anticipated during construction activities, which will require monitoring and management to minimization disruption to local residents, and to mitigate damage to roadways by heavy loads. Once construction is completed, transportation requirements will be much lower and should result in minimal disruption to local residents. With 17 total employees at the facility, daily traffic counts should not increase beyond the comfortable carrying capacity of the roadway. Short-term use of fuel oil may increase traffic requirements, but these events should be minimal, since the facility will be limited in terms of hours of annual operation on fuel oil.

The final configuration of the City of Faribault's anticipated traffic plan and road construction requirements have yet to be determined, and are a function of the ultimate selection of the site, and the requirements of each site for access. The preferred site would require marginally more temporary roadway construction for site access during construction activities than the alternate site. The cost of this construction is undoubtedly an inconsequential percentage of the total cost of construction of the facility. There is no significant difference between the affect on traffic between the preferred site and the alternate site.

Electrical and Status of Interconnect Studies

The Project is located near the intersection of a major natural gas pipeline and a major electrical transmission line, the Lake Marion – West Faribault 115 kV line. This location was selected so that the Project will provide the most benefits to regional and local area transmission while minimizing the construction of new transmission facilities. When the project is completed, the overall performance of the entire integrated regional transmission system will meet or exceed all applicable reliability criteria. The Project will improve some of the transmission constraints, or bottlenecks, which impede regional and inter-regional transactions. For instance, the Project counteracts the prevailing flow and reduces loading on defined constrained interfaces in southern Minnesota, central Wisconsin and North Dakota, and does not increase the flow on any other constrained interface more than the acceptable standard. The Project improves the reliability of the regional transmission system by reducing possible overloads of nearby regional transmission facilities that can presently occur during high stress conditions and facility outages.

The non-profit Midwest ISO (MISO) is an Independent Transmission System Operator that serves the electrical transmission needs of much of the Midwest. The MISO is committed to reliability, the nondiscriminatory operation of the bulk power transmission system, and to working with all stakeholders to create cost-effective and innovative solutions for our changing industry. In coordination with the MISO and Xcel Energy, Faribault Energy Park is studying two options for the Project's interconnection with the transmission grid. One possibility is to rebuild the Lake Mario – West Faribault 115 kV line to a higher capacity. This would entail the reconstruction of approximately 20 miles of line on the existing right-of-way. Alternatively, one could forego the rebuild of the 115 kV line and add a new 161 kV circuit from the plant site to the system. The new line could interconnect at either the South Faribault substation or at a new site further south along the South Faribault-West Owatonna 161 kV line. The addition of a new 161 kV circuit from the Project site to the existing system will provide a new transmission source to Owatonna and the surrounding area. There is a slight increase in 69 kV facility loading near Faribault during certain facility outages, but this can be mitigated by an operating procedure or line re-build.

The Project puts a new significant generation source in close proximity to major loads such as the Twin Cities metro area, Rochester, and the cities of south central Minnesota. This will improve energy supply reliability to these areas during extreme transmission outage and disturbance conditions such as those that occurred due to the June 25, 1998 storms. The new 161 kV line from the Project site to the system has three routing options. The longest of these would only require final determination of interconnect configuration and cost will be made in accordance with the MISO tariff.

The preferred site would require less distance of construction for the electrical interconnect than the alternate site. Based upon preliminary engineering cost estimates, it appears this cost differential could be as much as several hundred thousand dollars. In addition, construction of the interconnect from the alternate site would idle a considerable amount of land from potential development, and require the acquisition of potentially costly easements.

Fuel

Natural gas will be provided to the plant site by a new 16-inch line off the Northern Natural Gas mainline. The NNG mainline consists of five pipes ranging from 16 to 30 inches in diameter in southern Minnesota. The new 16-inch line (anticipated to operate in the range of 400 psi) to the plant site will consist of less than one mile of line and will be routed to the plant site on private easement. Because the gas distribution system is designed around a wintertime peak, there is sufficient excess natural gas available to serve the maximum needs of the plant (summertime, hot weather operation). The Project will have an interruptible natural gas supply. As a result, fuel oil is included as a backup fuel as required for MAPP accreditation. In addition, fuel oil may be used in limited circumstances when economics favor its use.

The preferred site would require significantly less construction of natural gas pipeline to access natural gas supply, resulting in substantially lower cost of construction than the alternate site. In addition, construction of the Project at the alternate site would require the acquisition of potentially costly easements, and make development of this land potentially less feasible and economically attractive.

Water

Maximum water use at the proposed facility would be less than 2 million gallons per day (mgd). This water would be used for chilled water cooling and fire protection purposes. Water would be stored in a large tank capable of holding approximately one million gallons. Water would be drawn from this tank and pumped to an on-site treatment facility where it would undergo demineralization. The bottom portion of the tank would store water that would be dedicated to fire protection. The tank's supply tap for the on-site treatment facility would be set above the level dedicated to fire protection. The on-site water treatment facility would produce high quality demineralized water that would be stored in a 250 thousand gallon tank. The demineralized water would be used for steam cycle makeup, power augmentation, and various purposes during plant start-up. Water for domestic uses, such as drinking fountains, showers, toilets and sinks would be obtained from the on-site wells.

Water is anticipated to be collected by two wells located at the northeastern and southwestern portion of the property – each capable of pumping sufficient water for plant cooling requirements for redundancy. Water supply is anticipated to be developed from the underlying Jordan aquifer, a regional bedrock aquifer located at a depth of approximately 700 to 800 feet below the Project (Minnesota Geological Survey, oral communication, September 2002). The Jordan aquifer is capable of developing substantial amounts of relatively high quality groundwater, and it is anticipated based upon preliminary information provided by the Minnesota Department of Natural Resources that a consumptive use of 2 mgd would not result in interference with nearby groundwater wells (Minnesota Department of Natural Resources, oral communication, September 2002).

Solid Waste Disposal

Wastes generated by the plant will be managed in accordance with applicable regulatory requirements. Sanitary wastes will be collected by a contracted waste disposal firm on a periodic basis and disposed at a permitted facility. Wastes generated as a result of ongoing maintenance activities at the facility will be characterized and if hazardous, recycled if possible, or properly disposed at a Resource Conservation and Recovery Act (RCRA) permitted Subtitle-C facility.

Wastewater

Sanitary wastewater generated from the maximum 17 employees at the Facility (calculated to not exceed 3,000 gpd or 0.003 mgd) and non-process building floor drains will be directed to an onsite septic system permitted in accordance with applicable Rice County requirements. The total estimated flow from these sources is approximately 3,500 gpd. Floor drains located in the fuel storage buildings or other process areas of the Facility will not be connected to the septic system nor is water from these areas included in this discharge.

Faribault Energy Park's proposal to discharge approximately 0.5 mgd of wastewater (comprised of facility drain waters, cooling tower blowdown, and other operational wastewater) to a created wetlands at the preferred site would require an NPDES permit issued by MPCA. This created wetlands is depicted in Figure 6 - Faribault Energy Park included at the end of this section. This permit would regulate the water quality and chemistry of the plant discharge based on the composition of the discharge water.

In the unlikely event this alternative be not approved in the permit process, wastewater would be discharged under NPDES permit directly into the unnamed tributary truncating the site. It is important to note the created wetlands is only feasible should the preferred site be selected, as the configuration of the alternate site would not allow this to be constructed. If the alternate site were selected, wastewater would be treated and discharged into the unnamed tributary of the Cannon River under applicable permit.

The composition of the fluids discharged would be controlled by the limitations and conditions written into the NPDES permit. Before the permit could be issued, Faribault Energy Park would be required either to submit adequate existing data from databases such as those held by the EPA, or to carry out background monitoring to characterize the baseline water quality and chemistry of the receiving water.

Regulated constituents in the wastewater include, but are not limited to, flow, temperature, acidity (pH), total suspended solids (TSS), oil and grease, and chemicals added to prevent equipment fouling. The heat impact of the wastewater would also be considered to prevent adverse impacts to aquatic life, primarily related to heat shock to fish and other aquatic life moving into the heated effluent plume. The design of the created wetlands onsite will include provision for heat dissipation of cooling water. The permit could also stipulate the frequency and duration of waste stream sampling required to ensure compliance with the permit conditions.

Hazardous Wastes

Hazardous wastes have become an important consideration in project development in that current legislation has required the identification of known sites where hazardous substances are present. Stringent safeguards are now in place to help protect against a potential release of these substances into the environment.

Secondary containment on fuel oil tanks will result in the generation of excess stormwater potentially contaminated with oily residue. This stormwater will be temporarily stored prior to offsite management by a service contractor.

The Facility is classified as a Conditionally Exempt Small Quantity Generator (CESQG). All permits are non-applicable.

An initial site assessment of the project area reveals no storage tanks that might result in costly cleanup liability. Prior land use does not indicate the presence of potentially contaminated materials.

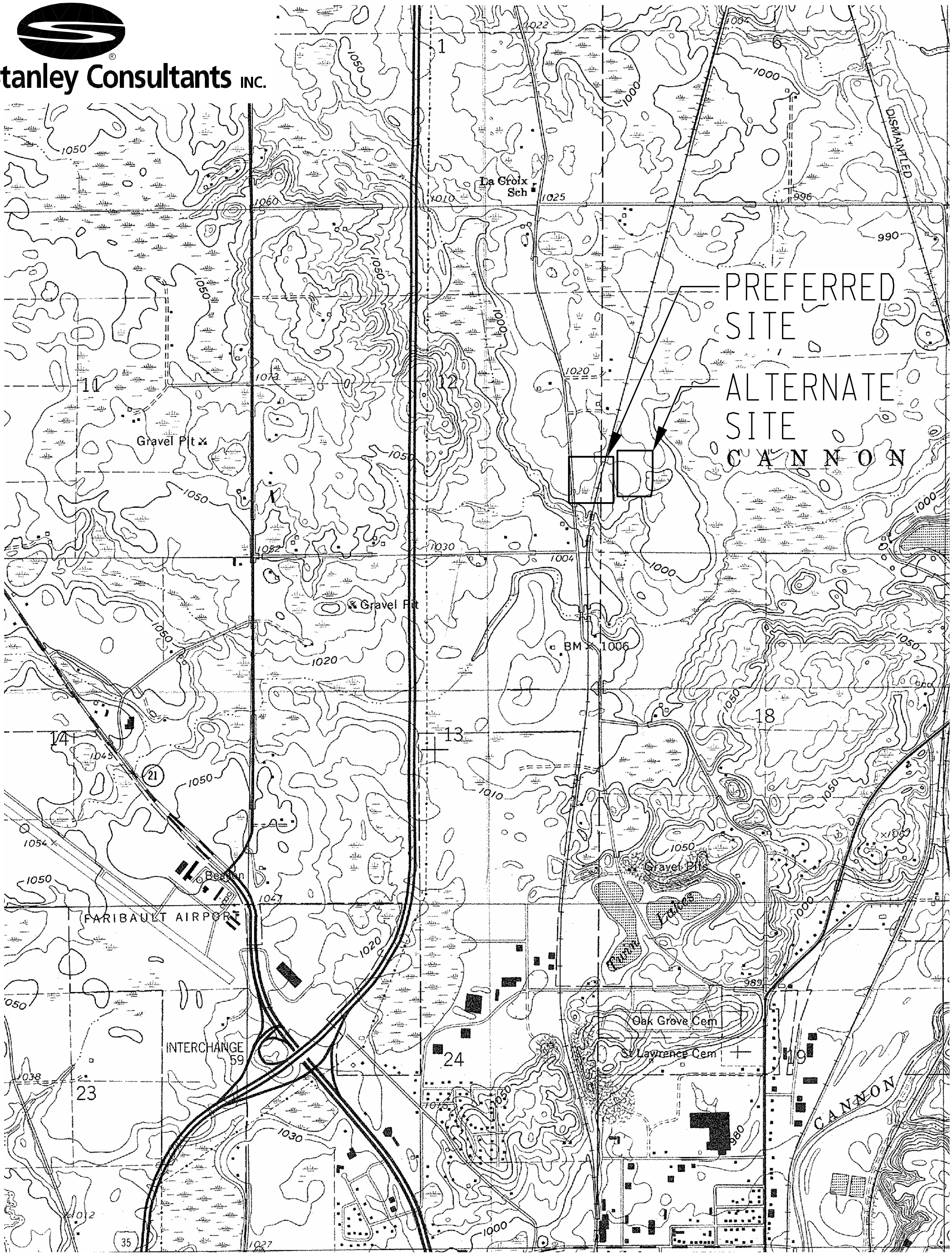
Federal, State, and Local Permits Required

- Prevention of Significant Deterioration (PSD) Permit including air toxics review.
- Minnesota Department of Natural Resources (MDNR) Water Appropriation Permit, in accordance with Minnesota Statute 103G.265.
- MPCA Air Permit (Title V), the Environmental Protection Agency (EPA) has granted interim approval for the Minnesota Department of Pollution Control Title V (Class I) operating permit program.
- Water Discharge Permit NPDES (MPCA), in accordance with Minnesota Rules Chapter 7077.
- Certificate of Need (Public Utilities Commission).
- Stack Height Determination (Federal Aviation Administration).
- Section 404/401 Permit (United States Army Corps of Engineers).
- Stormwater Discharge Permit (MPCA). The MPCA is currently in the process of developing a general stormwater permit to include both large and small construction activity.
- Well Construction Permit (Minnesota Department of Health), Minnesota Rules, Chapter 4725 (rules regulating Wells and Borings).
- Spill Prevention Control and Countermeasure (SPCC) Plan (No specific regulatory approval, maintained at facility).
- Local Zoning Permits.
- Miscellaneous Construction Permits as applicable.

Certificate of Need

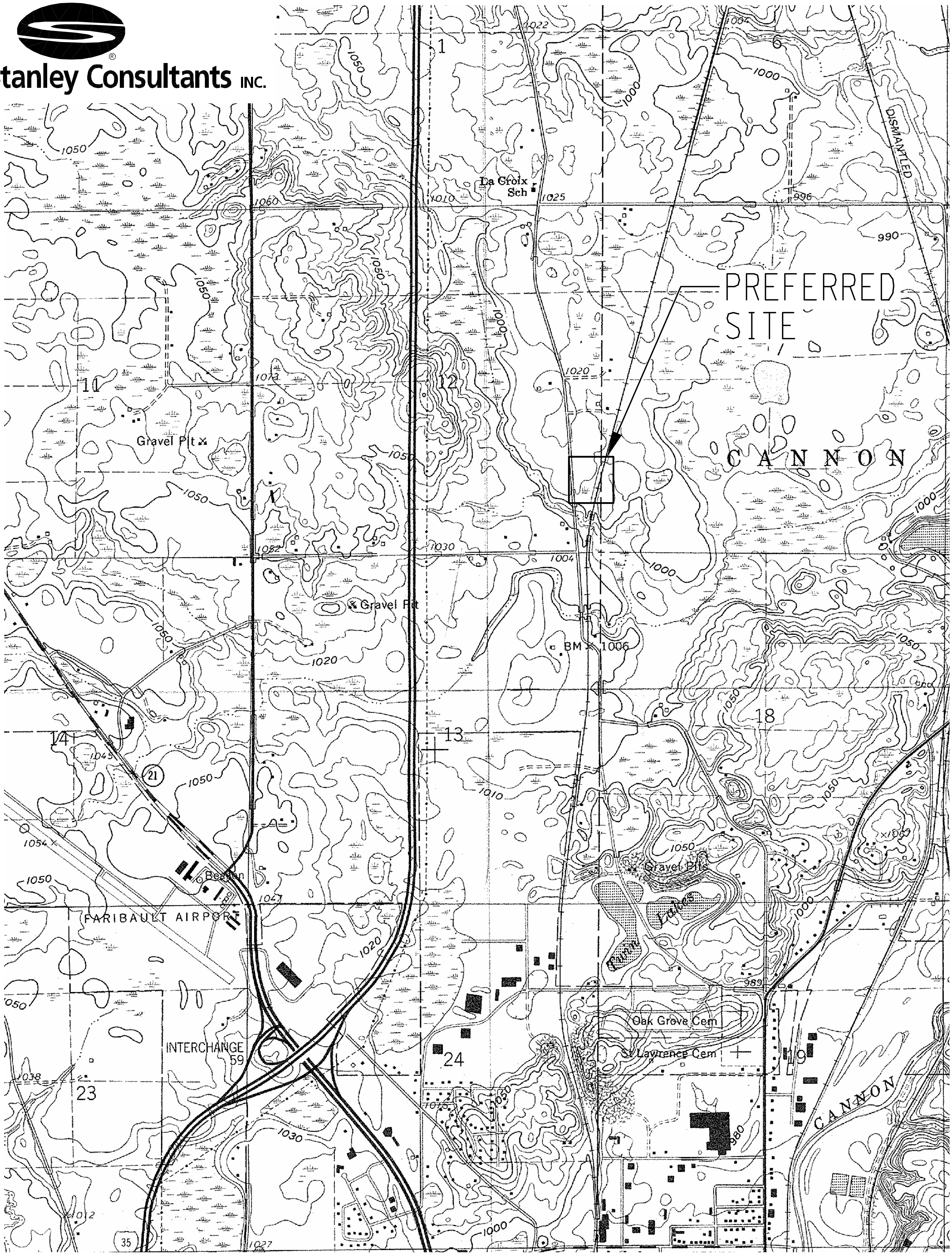
The PUC voted to approve the CON on July 10, 2003.

Stanley Consultants INC.



Vicinity Map
Figure 1

Stanley Consultants INC.



Vicinity Map
Figure 2

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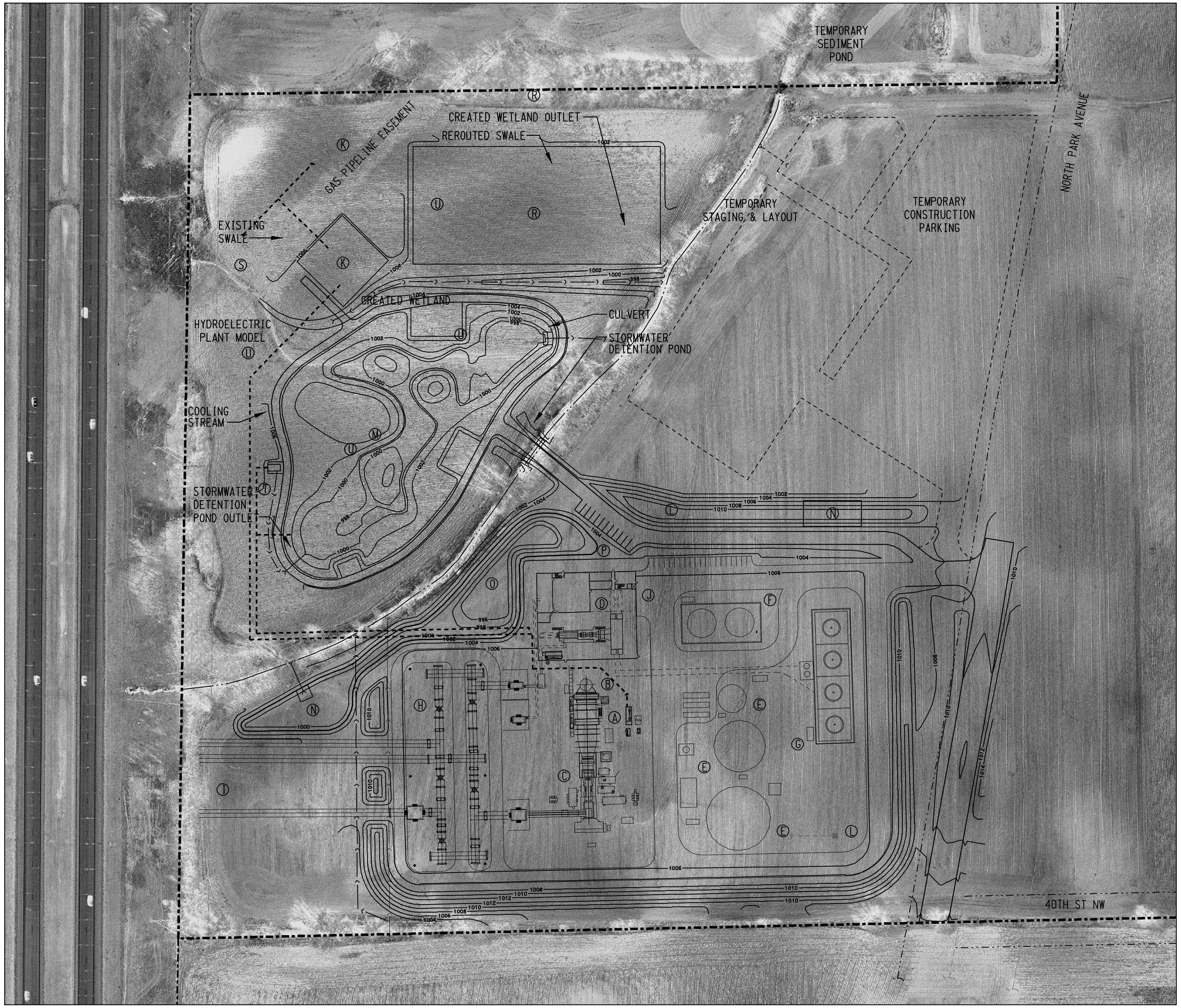

CONCEPT PLAN

FARIBAULT ENERGY PARK MAJOR FACILITIES
FACILITY
A. HEAT RECOVERY STEAM GENERATOR
B. STACK
C. NATURAL GAS TURBINE GENERATOR
D. STEAM TURBINE GENERATOR
E. WATER STORAGE TANK
F. FUEL OIL STORAGE TANKS
G. COOLING TOWER
H. ELECTRICAL SUBSTATION
I. TRANSMISSION INTERCONNECTION
J. STEAM TURBINE BUILDING
K. NATURAL GAS VALVE & METERING STATION
L. WATER WELL
M. CREATED WETLAND
N. SEPTIC ABSORPTION FIELD
O. STORMWATER DETENTION POND
P. PUBLIC PARKING & INTERPRETIVE DISPLAY AREA
Q. NOT USED
R. FUTURE GREENHOUSE
S. NATURAL GAS SUPPLY PIPELINE
T. PLANT EFFLUENT PIPELINE
U. ENERGY EDUCATION CENTER (HYDRO, SOLOR, WIND, OTHER)

N

Concept Plan
Preferred Site
Figure 3

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FARIBAULT ENERGY PARK MAJOR FACILITIES
FACILITY
A. HEAT RECOVERY STEAM GENERATOR
B. STACK
C. NATURAL GAS TURBINE GENERATOR
D. STEAM TURBINE GENERATOR
E. WATER STORAGE TANK
F. FUEL OIL STORAGE TANKS
G. COOLING TOWER
H. ELECTRICAL SUBSTATION
I. TRANSMISSION INTERCONNECTION
J. STEAM TURBINE BUILDING
K. NATURAL GAS VALVE & METERING STATION
L. WATER WELL
M. NOT USED
N. SEPTIC ABSORPTION FIELD
O. STORMWATER DETENTION POND
P. NOT USED
Q. NOT USED
R. NOT USED
S. NATURAL GAS SUPPLY PIPELINE
T. NOT USED
U. NOT USED

CONCEPT PLAN

Q:\16245\Figures\old plant layout.dgn
CADD B2-R4 © STANLEY CONSULTANTS

Concept Plan
Alternate Site
Figure 4

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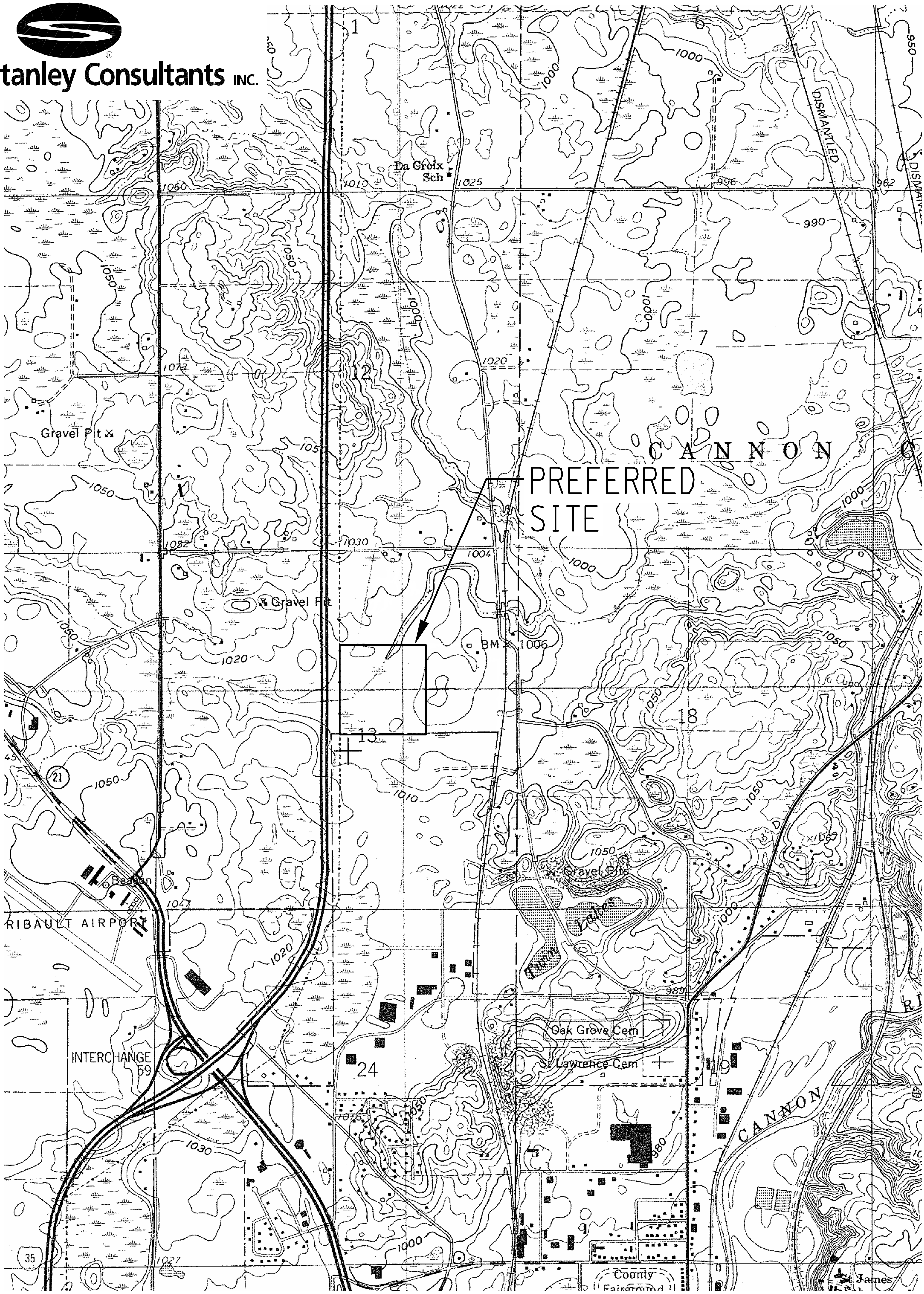

Preferred Alternative
Figure 5

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Faribault Energy Park

Faribault, MN August 2002

A - Future Greenhouse Area
B - Solar Panels
C - Wind Energy
D - Hydro power
E - Other

Figure 6
Faribault Energy Park

Section 3

Environmental Information

Interim Minnesota Rules 4400.1150 subpart 3 specifies environmental information that must be provided with a Site Permit Application. This section satisfies the rule.

Environmental Setting

The potential project area is located in the city of Faribault, west of Highway 76 and south of 170th Street West. The general area surrounding the Project is rural. The landscape is generally flat with few woods. The potential project area consists of cultivated farmland, which is owned by one landowner. The closest residence is located northeast of the Project and is occupied by a different owner. The address of this location is 17250 Acorn Trail and the property is owned by Ken Carpenter. This residence is located approximately 700 yards northeast of the preferred site property boundary. The preferred site location is due east of Interstate 35. The Lake Marion – West Faribault 115 KV overhead transmission lines are located west of the proposed sites. Much of the surrounding land is farmed in soybeans and corn. Detailed descriptions of the setting and natural resources follow.

The geology of the area is characterized by glacial till at the surface to a depth of approximately 30 feet below ground surface, in turn underlain by inter layered sands and gravels to a depth of about 70 feet, in turn underlain by bedrock. Surface topography is gently rolling, with little change in elevation in the area according to available topographic maps and visual surveillance of the area. A figure included in Section 2 titled Figure 1 - Vicinity Map provides the applicable United States Geological Survey (USGS) topographic map for the potential project area. The primary surface water drainageway in the area of the Project is a perennial stream, flowing northeast to the Cannon River. Anticipated construction for the preferred site involves the construction of created wetlands to manage spent cooling water, with an overflow by NPDES permit into this perennial drainageway. A figure included in Section 2 titled Figure 6 - Faribault Energy Park details this configuration.

Should the alternative site be selected, the footprint of the available land will not allow the construction of a created wetlands. In this case, process wastewater would be treated and then discharged into the unnamed tributary of the Cannon River under applicable permit.

Geotechnical data conducted as a function of evaluating soil bearing capacities and implications on engineering design indicate groundwater is relatively near surface. Groundwater levels are likely controlled by drainage tiles installed for agricultural purposes. Depth to groundwater appears to be about 6 feet below ground surface.

Impacts on Human Settlement

Displacement/Demographics

The construction of the Project on the preferred site would result in no displacement of any persons. The preferred site is currently farmland and one owner owns the land. Faribault Energy Park currently holds an option for the purchase of this property. Should the alternative site be selected, it is likely the nearest receptor would desire his property be purchased, resulting in the displacement of one person. In addition, this would result in an incrementally higher cost to acquire and clear this land.

The potential project area is within the City of Faribault city limits. According to the United States Census Bureau 2000 census, the population of Faribault was 20,818. There are 10,751 males and 10,067 females. The population consists of the following, 89.9 percent of the population is white, 2.7 percent African American, 0.7 percent Native American, 1.8 percent Asian, 0.1 percent Native Hawaiian or other Pacific Islander, 3.3 percent is some other race, and 1.5 percent are two or more races. The major industries in Faribault are manufacturing and educational, health and social services. The median family income for Faribault in 1999 was $49,662.

Noise

As a function of this Site Permit Application, local and state ordinances for noise were evaluated. Appropriate noise monitoring and calculations (supported by engineering) will be made to demonstrate that noise levels from the proposed plant will not exceed state or local noise tolerance levels. A variety of sources in natural, industrial, and community settings generate sound/noise. Sound is defined as the result of the vibration of millions of air molecules traveling in waves to our ears. Sound waves move outward from the vibrating source, weaken, and may be reflected or bent by obstacles as they travel. Each sound wave has a different frequency, or rate of speed. Humans are only able to hear sound that falls between 30 to 12,000 cycles per second. In general, noise is defined as unwanted sound. Hearing damage is the most serious effect of noise, but the nuisance of particular sound characteristics may diminish the quality of life for those affected by the noise. Sound/noise is measured using a unit known as a decibel (dB).

Several frequency weighing schemes have been used to derive a dB scale that estimates the level at which humans detect various stimuli. The development of this schematic is because humans are only able to hear certain frequencies at certain volume levels. This range is typically described as the A-weighted decibel scale, or the dBA scale. Table A-1 in Appendix A provides a summary of typical A-weighted sounds and their effects on human ears, along with anticipated equipment sound level specifications for standard packaged equipment in similar facilities for comparison.

Noise levels are given a constant equivalent dB level in order to develop single-value descriptions of the various noise levels. These units, denoted as Leq, give a numerical value to an average noise exposure over an average length of time. Time of day, annoyance, and other factors are taken into consideration when the Leq rating is determined. The Leq statistical descriptions are used to characterize noise conditions and are denoted as L10, L30, L50, etc., where the number represents the percentage of time studied that a noise is present and exceeds that level. For example, an air conditioning unit running in the background can be classified as an L90, and an airplane flying overhead may be classified as an L10.

Distance is a main criteria for measuring the strength of noise. For every doubling of distance from the noise source, a decrease of 6dB occurs from isolated sources. When studying noise originating from a continuous line, the dB level decreases by 3dB for every doubling of distance. This is the case when observing traffic on an interstate or highway. However, a dB decrease of 4.5 may be considered when the roadway is at ground level, and the ground located between the noise source and monitor is effectively absorbing sound. If the roadway is elevated, potential sound wave absorbers are absent, and the 3 dB decrease is used.

All of the above measurements are based on distance being the only varying factor. When conducting traffic noise studies several other variants must be taken into consideration. Included among these are wind, temperature, humidity, manufactured structures, and topographic elements. These elements contribute to the alteration of sound by diffracting sound waves and even increasing their intensity. All of these factors are taken into consideration when beginning a noise study.

Minnesota Rules Part 7030.0040, subpart two outlines the standards followed for noise pollution control. The regulatory agency responsible for the formation and implementation of these standards is the MPCA. These standards, according to the definition of land use activities, demonstrate consistency with the requirements for annoyance, hearing, and conversation, and sleep for all receptors within these areas classified as such.

In addition to the Minnesota Rules, the MPCA has also produced numerous noise area classifications (NAC) and the standards for each. These classifications are based on what activity is being conducted at the location of each receiver. The noise standard is then classified according to the listed NAC.

There are four noise area classifications as determined by the MPCA. NAC-1 applies to household units, hospitals, religious services, correctional institutions, and entertainment gatherings. NAC-2 land use activities consist of mass transit terminals, automobile parking, and retail trade. Some of the NAC-3 described land uses are manufacturing facilities, highway and street right-of-way, and utilities. Undeveloped and under construction land use areas compose NAC-4. The standards for these classifications are described in Appendix A, Table A-2.

Background Noise Survey

Faribault Energy Park conducted a preliminary background noise survey in the potential project area to determine ambient noise levels. A sound pressure meter was used to determine background noise levels at three locations, far west property line along transmission corridor, center of property near proposed plant and eastern property adjacent to railroad. Monitored levels were obtained for a 30-minute period and filtered by octave band.

The results of the noise monitoring indicate that existing noise levels on and adjacent to the property range from 54-59 dBA. These data were used as a baseline in noise impact modeling for the facility. Measurements were conducted at the periphery of the preferred site at exactly the midpoint of each side of the property boundary. Values for noise collected are presented in Table A-3a in Appendix A.

Noise During Facility Construction

The resulting construction noise to build the facility would consist mostly of a series of intermittent sources, most of which would originate from the diesel engine drive systems that power most construction equipment. It is likely that during peak construction, construction work may occur for 10 to 16 hours per day. Typical construction noises, as modeled for a similar power plant project in southeastern Wisconsin, are illustrated in Appendix A, Table A-3.

Noise During Facility Operation

While construction noise would be emitted during the development of the Project and erection of the plant, operational noise would be emitted throughout the life of the plant. Major noise sources introduced by the proposed project would include noises from combustion turbine, generator packages, HRSG, steam turbine/generator packages, generator step-up transformers, circulating and water feed pumps, and cooling towers. Audible operational noise levels from the plant should be maintained at a low level compared to the existing ambient levels so that the overall increase in noise is minimal.

Estimates of noise levels at various distances form the source were made to determine the impact of the new facility on ambient and background levels. Estimates of noise generation from each piece of equipment generating continuous noise at the proposed facility were obtained from manufacturer's data. Noise levels were calculated by logarithmically adding each source's contribution to total level at specific distances. The background levels monitored previously were also added to obtain the peak Leq, A-weighted, using FHWA noise prediction model, the FHWA TNM, Version 1.0 (FHWA TNM) The noise modeling estimates maximum noise levels at the plant boundary to be 62-65 dBA, which is within the limits of MPCA for industrial and commercial zoning. A noise isopleth diagram titled Figure 7 – Noise Isopleth is included at the end of this section.

Aesthetics

From a visual perspective, the construction of the Project could appear chaotic or interesting, depending on the viewer's frame of mind. In this part of Minnesota, farmland mingles with housing developments, large commercial or industrial buildings, and transmission lines. The potential project area is located in an undeveloped area of Faribault, planned for industrial development, adjacent to Interstate 35, and will be sited on a 37-acre parcel. The landscape is generally flat with few woods, so that people can see for long distances. The facility should be visible from about a mile away, primarily from Interstate 35 and other surrounding roadways, nearby residents, and the adjacent farmland. Figure 6 - Faribault Energy Project included in Section 2 presents a rendering of the Project from the perspective of the preferred site.

The Project will have a single exhaust stack that will be 170 feet high.

The Project will provide a strong visual impression of modern industry. The existing farm field around the proposed facility and the intermittently vegetated fence lines with scrub growth give a strong visual impression of rural Minnesota. The proposed plant would change the view of people living in or working around the farm houses nearest to the potential project area. These people would see a commercial-looking building, possibly with natural lines and colors curving behind and to one side of it (assuming the preferred site is selected and the constructed wetlands for effluent treatment is permitted). In addition, construction at the preferred site would allow the development of an interpretive park around the created wetlands, resulting in a resource that would improve the aesthetics of this area and provide a recreational resource.

There is probably no attractive way to mitigate the view of construction. However, the final appearance of the proposed plant could be altered by a number of details, such as shrub and tree plantings, fences, paint colors, and lighting. The success of this type of mitigation depends on the final design.

Faribault Energy Park would light the plant site in a manner similar to other industrial sites. Lighting may also increase at special times during construction or operation (for construction at night or during special plant maintenance). This means that the level of light would increase near the site. Faribault Energy Park would use outdoor light fixtures that shade the source of light, directing the light downward, so that it is unlikely that their lighting would light up the night sky or create a nuisance for nearby homeowners. Faribault Energy Park would decide on the location of lights during the final project design phase. The Federal Aviation Administration may also require a light or lights on the plant stack. Under certain meteorological conditions, the facility's stack would also emit a visible steam plume that, after traveling a relatively short distance, would dissipate by dispersion and evaporation. A visible plume can be expected to occur when ambient air temperatures are relatively low with respect to plume temperature, thus promoting plume cooling and condensation, and ambient humidity levels are relatively high, preventing evaporation of the water in the plume. The persistence of the plume is dependent upon wind speed at the time required for evaporation and dispersion.

Human Health and Safety

Construction and normal operation of the project is not expected to have any measurable adverse effect on the health of plant construction workers, operating personnel, or residents of the surrounding area. Typical potential health concerns are related to worker accidents, worker and public exposure to noise, impacts from air emissions, electric and magnetic field exposure, and security issues.

Safe construction practices and adherence to Occupational and Safety Health Administration (OSHA) regulations will mitigate dangers present to workers during heavy construction projects and operations.

Harmful noise exposure to workers during construction and operation of the plant will be prevented through use of hearing protection and adherence to OSHA rules related to hearing protection. See the "Noise" section for details about the levels of noise expected at the plant site.

The proposed project will be constructed and operated in accordance with all applicable air quality rules and regulations. More details on air quality can be found in this report.

Electric and magnetic fields (EMF) arise from the flow of electricity and the voltage of a line. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors. Electric and magnetic fields emanating from transmission lines have been a concern to the general public in similar projects in the past. In May of 1999, the National Institute of Environmental Health and Sciences (NIEHS) released a study clarifying the potential health risks from exposure to extremely low frequency – electric and magnetic fields (ELF-EMF). The study concludes:

> *"ELF-EMF exposure cannot be recognized at this time as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. The finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern."*

The Project will have minimal impacts to the security and safety of the surrounding area. The generating facility will be fenced and access limited to authorized personnel only during construction and operation. This will keep curious youngsters away from the dangerous equipment.

Socioeconomic Impacts

The proposed generating facility is not expected to present adverse impacts to the social and economic character of the project area. The economic character of the project area could be enhanced by the proposed generating facility due to the enhanced possibility of the construction of an industrial area using energy from the Project.

During the peak construction period, the facility would be expected to generate 250 jobs, approximately $5 million in local expenditures, and a payroll of approximately $15 million. Once in operation, the plant would have approximately 17 full-time employees, including residents of the local community. Faribault Energy Park intends to be an active member of the local community, participating in charitable and community service organizations.

Construction and operation of the generating facility would have a negative impact on local homeowners with the increase of traffic in the area. While the project is under construction, local motorists would be temporarily inconvenienced by the increase in large construction vehicles on the roadways. These roads could become damaged during the construction process, but would be surfaced and maintained as necessary by the Faribault Energy Park to provide suitable access to the generating facility during operation.

The potential project area would be converted from agricultural land to an industrial area. Approximately 12 acres of farmland will be converted to industrial use. This decreases the natural resources of the land, and has a negative effect on the current and surrounding landowners. The presence of the generating facility will have an unknown effect on the local property values, although adjacent land values have the potential to rise considerably if converted to industrial use.

Secondary development may occur if the power plant is built. Natural gas is already available in the area. The electric transmission line connected to the proposed power plant would not serve other customers, and the power that the plant produced would be sold wholesale through the transmission system. Faribault Energy Park intends to market the facility's steam production for possible use for other manufacturing facilities in the area, perhaps attracting additional industry to the area.

The facility may also operate on fuel oil as an emergency backup fuel, for economic reasons, and because it is required for MAPP accreditation. This alternate fuel supply will increase the reliability of the power supply in the event of natural gas supply interruption. The fuel oil would be received by truck deliveries. At this time, Faribault Energy Park does not anticipate delivery of fuel oil by pipeline.

In summary, a short-term positive economic benefit would result from the construction of this project. The project will generate construction-related employment and expenditures at nearby businesses. The City of Faribault may experience increased business activity during construction. After the construction is over and the plant would be in operation, the economic benefit would continue to be positive with the addition of approximately 17 permanent full time positions. In addition, the Project could attract additional industry to the area, resulting in additional capital investment and consequent growth in employment.

Recreation

There are numerous state parks and recreation areas throughout the state of Minnesota. Several of these sites are located near the city of Faribault, in the southeast portion of the state. The MDNR was contacted and provided information about state parks and resources in the project area (MDNR, oral communication, September 2002). Sakatah Lake, Nerstrand Big Woods, and Rice Lake are near Faribault and the project site. Sakatah Lake is 14 miles west of Faribault and offers biking, hiking, and camping. Nerstrand Big Woods is about 9 miles northeast of Faribault and offers hiking and camping. Rice Lake is located southeast of Faribault and offers canoeing and bird watching. In addition, there is a MDNR area office approximately one mile to the south of the project site. These recreational areas are remote locations in reference to the project site and will not be impacted by this project. Therefore, no mitigation is necessary.

Public Services

The facility will not require potable water or sanitary treatment by nearby governmental authorities, but will utilize fire and police services, anticipated to be provided by the City of Faribault.

The Faribault Fire Department provides emergency response for the City of Faribault and surrounding townships. The department is comprised of one Director of Fire & Code Services, nine full-time firefighters, thirty part-time firefighters and a full-time department secretary. The fire department building is located at 122 Northwest 2nd Street. It is not anticipated that the generating facility will significantly affect the capabilities of the fire department.

The Faribault Police Department is a full service agency made up of administration, patrol (with a full time community crime prevention officer), investigations (with full time school liaison officer), records, and special services unit for parking and animal control and nuisance abatement. It is not anticipated that coverage of the generating facility will significantly affect the capabilities of the police department.

Effects on Land Based Economics

Land Use

Currently the land use of the potential project area is agricultural. The land is a cultivated farm field and is owned by one person.

Minnesota Rules Chapter 4400.3450 subpart 1 states that no generating plants may be located in any of the prohibited sites. There are no prohibitive sites at the project location such as:

- National parks;
- National historic sites and landmarks;
- National historic districts;
- National wildlife refuges;
- National monuments;
- National wild, scenic, and recreational riverways;
- State wild, scenic, and recreational rivers and their land use districts;
- State parks;
- Nature conservancy preserves;
- State Scientific and Natural Areas; and
- State and national wilderness areas.

In 1989, a land use plan was developed for the City of Faribault by the City Council and Planning Commission, and with the assistance of City staff and various citizen advisory boards. In this plan, population projections are made out to 2010. Continued growth is expected in these projections.

In the 1989 plan, the land use is detailed for areas within the corporate boundaries of the City of Faribault and some fringe areas. Both sites were not within the corporate boundaries of

Faribault at that time, although it has since been annexed. City of Faribault City Planners are in the process of reviewing proposed plat plans for industrial development in this area. The facility is a key component of this planned expansion.

In summary, Faribault's land use plan suggests that the long-term plan for the project area will be an industrial area. Therefore, there will be no long-term impact on the land use of the area. The current property owners will be adequately compensated for the purchase of their land.

Zoning

The evaluated sites for the Project are within the corporate limits of the City of Faribault, and is industrially zoned.

Agriculture

Either project site would be converted from agricultural land to an industrial park. This decreases the natural resources of the land, and has a negative effect on the current farmer, although the impacted landowner will be compensated at a much higher rate for his land than he otherwise might if he sold it for agricultural reuse. The presence of a natural-gas power plant will have an unknown effect on local property values. The facility will have the ability to sell steam to industrial end-users, who might find it attractive to locate nearby to access this resource. If that should happen, land values in the immediate area should rise. Since the facility will have a minimal noise impact, with relatively low emissions, and will have low traffic following construction, impact on property values is expected to be low.

Prime Farmland

Prime farmland, as defined in CFR Title 7, 657.5 a, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Prime farmland is also available for other uses including cropland, pastureland, rangeland, forestland, or other land, but not urban build-up land or water. The Natural Resource Conservation Service (NRCS) classifies soils that are considered prime farmland.

In 2000, a soil survey was published for Rice County by the NRCS in cooperation with the Minnesota Agricultural Experiment Station. The survey contains a list of soils that are considered prime farmland in the county. About 186,726 acres, or nearly 57 percent of the Rice County area, meets the requirements for prime farmland.

Several soils within the potential project area are characterized as prime farmland. Table A-4 in Appendix A shows the soils that are considered prime farmland. Hayden loam with 2-6 percent slopes is considered prime farmland. Cordova clay loam with 0 to 2 percent slopes where drained is considered prime farmland. Glencoe clay loam depressional with 0 to 1 percent slopes where drained is considered prime farmland. By visual inspection, these three soils combined, take up approximately 75 percent of the project area.

The area of prime farmland used by the generating station will be well within the area allowed by Minnesota state rules. Minnesota Rule 4400.3450 subpart 4 states that no large electric power generating plant site may be permitted where the developed portion of the plan site, excluding water storage reservoirs and cooling ponds, includes more than 0.5 acres of prime farmland per megawatt of net generating capacity. Given the nominal 250 MW capacity Generating Station, this rule would allow up to 125 acres of prime farmland for the generation station site. Since the project area of the generation station site requires substantially fewer acres than allowed, it is consistent with Minnesota Rule 4400.3450.

Forestry, Tourism, Mining

Since either of the potential sites are currently used as farmland, the Project does not have the potential to adversely affect mining, forestry, and tourism. According to a 1998 Mineral Industries map from the MDNR, mining operations in Rice County include horticultural peat and crushed stone mining. These operations are not within the potential project area. In addition, MDNR forestry maps indicate that there are no state forests near the potential project area.

Transportation

Roadways

The potential project area is located off Highway 76 to the west, south of 170th Street West, and east of Interstate 35. Roads near the Project will be utilized as much as possible to reduce the area disturbed. These roads will be maintained as necessary, and provided with adequate drainage.

Rice County Highway Department has indicated that the 2001 average daily traffic for Highway 76 is 180 vehicles per day. Traffic counts for other roadways are not available (oral communication, Rice County, September 2002).

Depending upon the facility's exact location, paving may be required of up to ½ mile of existing roadway or construction of a new plant entrance road. The preferred site will require marginally more road construction for the actual construction phase of the Project. At this time, the City of Faribault's exact plans for requirements for roadway construction and access in this planned industrial park are unknown. Any new roads will be constructed with the least amount of impact possible and according to necessary safety standards. Roads would be built and maintained to provide safe operation. The City of Faribault is in the planning process to develop the area near the proposed facility. This planning process involves the design of roadways in the area to provide access and enhance development. Faribault Energy Park is working closely with the City of Faribault in this planning process.

Traffic near the proposed facility will increase during construction. Local motorists would be temporarily inconvenienced by the increase in large construction vehicles on the roadways and possible delays in traffic. These roads could become damaged, but would be surfaced and maintained as necessary to provide suitable access to the generating facility. Traffic on local roads will increase during construction with anticipated 250 individuals traveling to the job site each day. This impact is expected to last during the construction period of 21 months. Traffic due to the construction workers could be expected to produce local impacts over a thirty-minute period at the beginning and end of the day and each time a change in shift occurs.

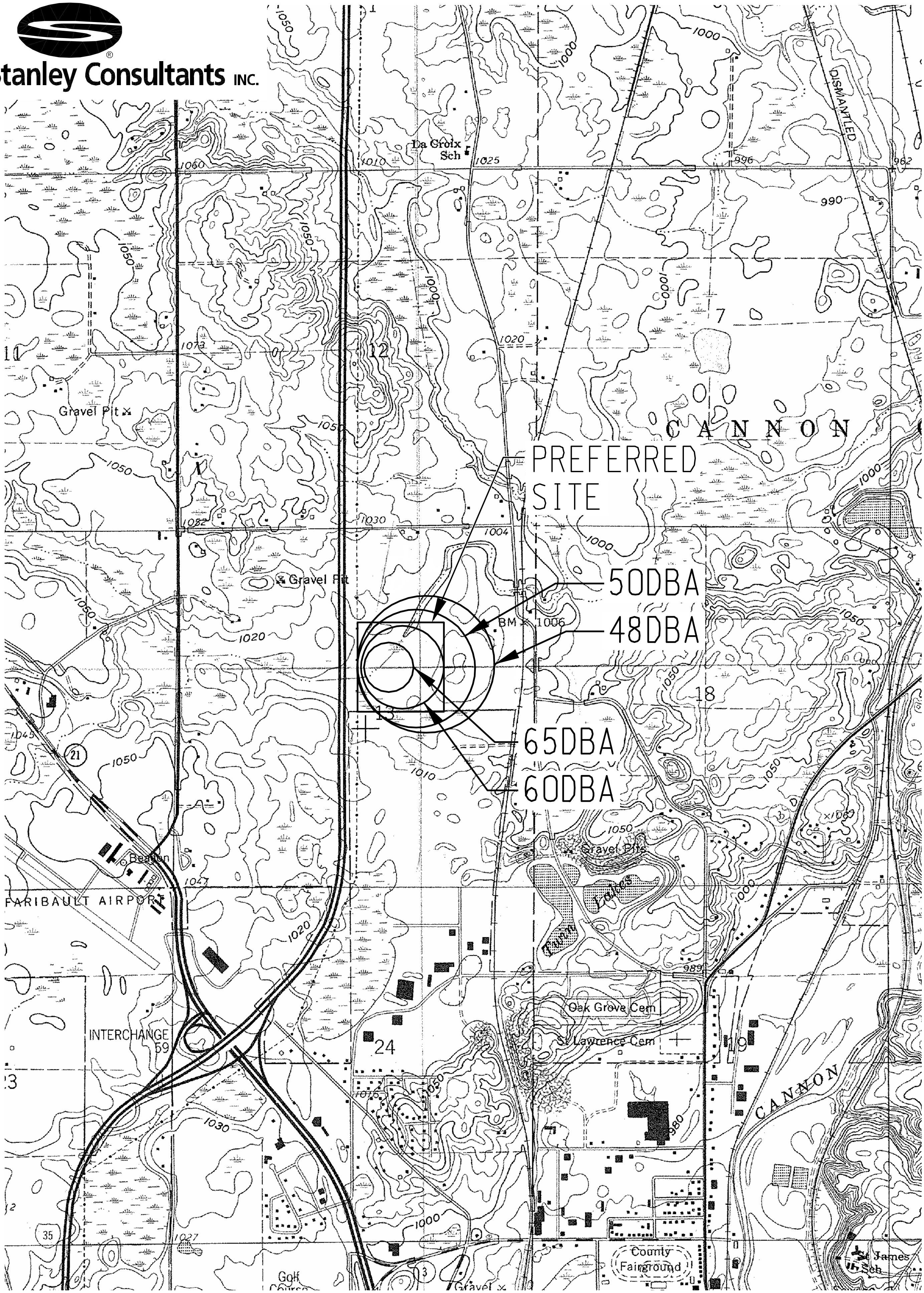
Traffic near the proposed facility will increase slightly during plant operation. A maximum of 17 individuals will work at the facility during operation. In addition, truck traffic would be expected to increase slightly with truck deliveries to the plant, primarily during short-term fuel oil deliveries to the plant. The plant will not burn fuel oil on an extended basis because of air permit limitations.

Airport

The Faribault Municipal Airport is a general aviation airport that serves Faribault and Rice County with a main runway oriented northwest to southeast. It is located three miles northwest of the center of the City of Faribault, and two miles southwest of the potential project area. It is owned and maintained by the City of Faribault and features a paved runway extending 4,254 feet. The Project will not affect the airport.

As a function of the permitting portion of the facility, the Faribault Energy Park will secure a flight hazard determination from the Federal Aviation Administration (FAA). This will involve providing the FAA the general configuration of the facility along with the elevations of the buildings. The primary area of concern in this effort will be the stack height for the single exhaust stack of the facility. The FAA will issue a finding that will likely include provision for lighting the stack for pilot visibility.

Stanley Consultants INC.



Noise Isopleth
Figure 7

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Section 4

Archaeological and Historic Resources

IMA Consulting, Inc. was retained to perform a Phase I Historical, Cultural, and Archaeological Resources evaluation of the potential project area. IMA Consulting shares a professional services agreement with its parent organization, the non-profit Institute for Minnesota Archaeology.

IMA Consulting, Inc. concluded the construction of the facility has no potential to impact significant historical, cultural, or archaeological resources in potential project area. Their report is provided in Appendix B.

Section 5

Effects on the Natural Environment

Land and Soils Impact

The potential project sites are in a geologic area with depth of unconsolidated materials up to 70-feet deep. Geologic formations consist of glacial till interlaced with variable quantities of glacial lake and glacial outwash materials. Much of the resulting soils are fine-grained and generally not very well drained. The specific conditions at the sites are typical of this area, made up of relatively poorly drained silt loams and loams.

According to the Rice County Soil Survey, four different soils are found within the project area sites. In Appendix A, Table A-5 details the soil types and the following summarizes the characteristics of the soils on the project area sites:

- **Cordova Clay Loam, 0-2 Percent –** A poorly drained soil with moderately slow permeability. This soil can be found on the microlows of moraines.
- **Hayden Loam 2-6 Percent –** A well-drained soil with moderate permeability. This soil can be found on the summits of moraines.
- **Hayden Loam 6-12 Percent Eroded –** A well-drained soil with moderate permeability. This soil can be found on the backslopes and shoulders of moraines.
- **Glencoe Clay Loam, Depressional 0-1 Percent –** A very poorly drained soil with moderately slow permeability. This soil can be found in the depressions on moraines.

All of the soil materials on which the Project would be built have supported crops and are the types of soil materials that can support the proposed construction. Construction would remove, compact, and mix soil profile layers. Any equipment operated during wet periods on the poorly drained soils where nothing is to be built would damage their structure. Those poorly drained soils have required tile drainage to crop, and their hydrological and biological functions would support landscaping and be enhanced by creating of native prairie or wetland communities.

Construction and landscaping would need to avoid compaction that would damage soil percolation and cause erosion of soil that would plug the drainage ditch. Past and current land uses have resulted in the disturbance of native soils. Therefore, the overall impact of the construction will be minimal.

Several aspects of the project will be constructed to enhance the natural environment, as depicted on Figure 6 - Faribault Energy Park included in Section 2. If the preferred site is selected, constructed wetlands will be built (contingent on MPCA NPDES permit authorization to discharge spent cooling water to serve as a water source). These wetlands will be constructed as an educational park for area citizens, and will actually serve to mitigate erosion in this area while developing a natural habitat. Stormwater will be managed by construction of a stormwater retention pond in conjunction with applicable regulatory requirements, with possible overflow into these constructed wetlands.

If the alternative site is selected, the footprint and topographic considerations would not allow the construction of a created wetlands or interpretive park. Treated wastewater would be discharged into the unnamed tributary of the Cannon River under applicable permit. Stormwater would be managed in a stormwater retention pond and outfall into the unnamed tributary of the Cannon River under applicable permit.

During construction, Best Management Practices (BMPs) will be used to prevent erosion. Examples of BMPs include:

- Installation of silt fences around the construction perimeter prior to excavation and grading.
- Maintenance of silt fences until stabilization of soils is achieved.
- Establish erosion control measures in stockpile areas.
- Mulch and vegetate areas not planned to be paved or built on in a timely manner to reduce erosion and seedling mortality.
- Apply riprap at outfalls of culverts and stormwater holding ponds to dissipate energy and control erosion.

Air Quality

Sources of Emissions to the Air

Emissions of air pollutants will occur because of combustion of fuels from several sources within the proposed facility. The primary source of combustion-related emissions is the combined-cycle gas turbine. Secondary combustion sources include an auxiliary boiler, an emergency generator, and a fire pump engine. The combustion turbine will be fueled by natural gas, while the auxiliary boiler may be fired with either natural gas or fuel oil, with the emergency generator fired only by fuel oil. Other non-combustion emission sources include fuel-oil storage tanks, a cooling tower, and traffic/roadway related fugitive emissions.

Air Pollutants Emitted

The pollutants generated from combustion activities include five criteria pollutants and several hazardous air pollutants. These pollutants and the predicted emission of these pollutants from the facility are shown in Table A-6 in Appendix A. These anticipated emissions were derived through site-specific calculations of potential operating emissions at the proposed Project sites, and are consistent with applicable permit applications. Through the selection of good combustion technology, use of good operating practices, the preferential use of natural gas as a fuel source, and the use of add-on control to abate NO_x emissions, the Faribault Energy Park will strive to minimize associated adverse impacts to the air from the proposed facility.

There are five pollutants NO_x, CO, PM_{10}, SO_2, and VOC that exceed the threshold for Prevention of Significant Deterioration (PSD) as defined in the Clear Air Act (CAA). Selected emission controls are presented in this section.

The facility-wide potential emissions of hazardous air pollutants will be well below the major source thresholds as defined by the National Emission Standards for Hazardous Air Pollutants (NESHAP) contained in Title III of the CAA.

Control Measures

This section presents a summary of the pollutants requiring control technologies and the selected control. The analysis and selection of Best Available Control Technology (BACT) for the Combustion Turbine (CT) operating in combined cycle, firing natural gas for a maximum of 8,000 hours per year and fuel oil for a maximum of 2,500 hours per year. In addition, supporting information is presented for the determination of BACT for the 40 MMBtu/hr boiler and cooling tower.

Any major stationary source or major modification subject to PSD must conduct an analysis to ensure the application of BACT. The requirement to conduct a BACT analysis and determination is set forth in Section 165(a)(4) of the CAA, in federal regulation 40 CFR 52.21(j), in regulations setting forth the requirements for State Implementation Plan (SIP) approval of a State PSD program at 40 CFR 51.166(j), and in the SIP's of the various States at 40 CFR Part 52, Subpart A - Subpart FFF.

As described, five pollutants, NO_X, CO, PM_{10}, SO_2, and VOC exceed PSD significance thresholds thereby requiring BACT analysis. The greatest contributor of these emissions is the CT and a pollutant-by-pollutant analysis is presented for the BACT determination of this unit.

Formation of NO_x

NO_X is generated from the proposed facility during the combustion of natural gas in the CT. Nitrogen oxides form in the gas turbine combustion process because of the dissociation of nitrogen (N_2) and oxygen (O_2) into N and O, respectively. Reactions following this dissociation result in seven known oxides of nitrogen: NO, NO_2, NO_3, N_2O, N_2O_3, N_2O_4, and N_2O_5. Of these, nitric oxide (NO) and nitrogen dioxide (NO_2) are formed in sufficient quantities to be significant.

Virtually all NO_X emissions originate as NO. This NO is further oxidized in the exhaust system or later in the atmosphere to form the more stable NO_2 molecule. There are two mechanisms by which NO_X is formed in turbine combustors: (1) the oxidation of atmospheric nitrogen found in the combustion air (thermal NO_X and prompt NO_X) and (2) the conversion of nitrogen chemically bound in the fuel (fuel NO_X).

Thermal NO_X is formed by a series of chemical reactions in which oxygen and nitrogen present in the combustion air dissociate and subsequently react to form oxides of nitrogen. The major contributing chemical reactions are known as the Zeldovich mechanism and take place in the high temperature area of the gas turbine combustor. Simply stated, the Zeldovich mechanism postulates that thermal NO_X formation increases exponentially with increases in temperature and linearly with increases in residence time.

Flame temperature is dependent upon the equivalence ratio, which is the ratio of fuel burned in a flame to the amount of fuel that consumes all of the available oxygen. An equivalence ratio of 1.0 corresponds to the stoichiometric ratio and is the point at which a flame burns at its highest theoretical temperature. Therefore, as air to fuel ratios approach this stoichiometric equivalence ratio, thermal NO_X production increases.

Fuel NO_X (also known as organic NO_X) is formed when fuels containing nitrogen are burned. Molecular nitrogen, present as N_2 in some natural gas, does not contribute significantly to fuel NO_X formation. With excess air, the degree of fuel NO_X formation is primarily a function of the nitrogen content in the fuel. The fraction of fuel-bound nitrogen (FBN) converted to fuel NO_X decreases with increasing nitrogen content, although the absolute magnitude of fuel NO_X increases. For example, a fuel with 0.01 percent nitrogen may have 100 percent of its FBN converted to fuel NO_X, whereas a fuel with a 1.0 percent FBN may have only a 40 percent fuel NO_X conversion rate. The low-percentage FBN fuel has a 100 percent conversion rate, but its overall NO_X emission level would be lower than that of the high-percentage FBN fuel with a 40 percent conversion rate. Nevertheless, fuel NO_X is not currently a major contributor to overall NO_X emissions from stationary gas turbines.

Identification of NO_x Control Technologies

NO_X may be minimized at the front-end of the CT system by preventing the initial formation of NO_X or it may be controlled at the back-end of the system through add-on control technology. An extensive BACT analysis was performed to determine the most effective NO_x control technology. Technologies considered where:

- Dry Low NO_X Combustion Techniques (DLN)
- Steam/Water Injection Control Techniques
- Selective Catalytic Reduction (SCR)
- Emerging Technologies (SCONOX and XONON systems)

The selected technology is Selected Catalytic Reduction (SCR)

Selective Catalytic Reduction (SCR)

The SCR process reduces NO_X emissions by injecting ammonia into the flue gas. The ammonia reacts with NO in the presence of a catalyst to form water and nitrogen. In the catalyst unit, the ammonia reacts with NO_X primarily by the following equations:

$$NH_3 + NO + 1/4\ O_2 \rightarrow 6\ N_2 + 3/2\ H_2O\text{; and}$$

$$NH_3 + 1/2\ NO_2 + 1/4\ O_2 \rightarrow 3/2\ N_2 + 3/2\ H_2O$$

The catalyst's active surface is usually a noble metal, base metal (titanium or vanadium) oxide, or a zeolite-based material. Metal-based catalysts are usually applied as a coating over a metal or ceramic substrate. Zeolite catalysts are typically a homogenous material that forms both the active surface and the substrate. The geometric configuration of the catalyst body is designed for maximum surface area and minimum obstruction of the flue gas flow path to maximize conversion efficiency and minimize backpressure on the gas turbine.

An ammonia injection grid is located upstream of the catalyst body and is designed to disperse the ammonia uniformly throughout the exhaust flow before it enters the catalyst unit. In a typical ammonia injection system, anhydrous ammonia is drawn from a storage tank and evaporated using a steam- or electric-heated vaporizer. The vapor is mixed with a pressurized carrier gas to provide both sufficient momentum through the injection nozzles and effective mixing of the ammonia with the flue gases. The carrier gas is usually compressed air or steam, and the ammonia concentration in the carrier gas is about 5 percent.

An alternative to using the anhydrous ammonia/carrier gas system is to inject an aqueous ammonia solution. This system removes the potential safety hazards associated with transporting and storing anhydrous ammonia and is often used in installations with close proximity to populated areas. An anhydrous ammonia system is considered in this BACT analysis.

The NH_3/NO_X ratio can be varied to achieve the desired level of NO_X reduction. As indicated by the chemical reaction equations listed above, it takes one mole of NH_3 to reduce one mole of NO, and two moles of NH_3 to reduce one mole of NO_2. The NO_X composition in the flue gas from a gas turbine is over 85 percent NO, and SCR systems generally operate with a molar NH_3/NO_X ratio of approximately 1.0. Increasing this ratio will further reduce NO_X emissions but will also result in increased unreacted ammonia passing through the catalyst and into the atmosphere. This unreacted ammonia is known as ammonia slip and is generally designed at a rate of 5 ppm to 10 ppm.

Determination of Economic, Energy, and Other Environmental Impacts of NO_x Control Technologies

Following the top-down analysis, the first technology to consider for economic, energy and other environmental impacts is the control combination of Dry Low NO_X design with SCR. This scenario uses a baseline uncontrolled NO_X emissions of 690.64 tons per year. This is developed from a 100% load-operating scenario firing 8,760 hours per year, where 6,260 hours are on natural gas and 2,500 hours are on fuel oil. Although turbines have a higher NO_X emission rate during start-up and shutdown, the SCR catalyst system is not active during this period because the exhaust is not hot enough to maintain the controlled reaction.

Economic Impact Analysis

The cost estimate procedure used for this BACT analysis is consistent with methodology of the EPA Office of Air Quality Planning and Standards (OAQPS) Control Cost Manual, Fifth

Edition and the recent updates that are posted on the EPA Clean Air Technology Center Internet site http://www.epa.gov/ttn/catc/products.

Selective Catalytic Combustion Technology

As shown in Table A-8 in Appendix A, the range of achievable emission rate for NO_X with SCR is 2.5 to 4.5 ppmvd. To optimize ammonia slip at 10 ppmv, it is estimated that 3.0 ppmv NO_X control can be achieved. The issue of ammonia slip is discussed further in the environmental impacts analysis of this evaluation. For purposes of designing the SCR and estimating its cost-effectiveness, a 3.0 ppmvd NO_X concentration will be used in this analysis. The Purchased Equipment Costs (PEC) of SCR housing and catalyst were estimated using design and cost estimating methodology recently published by the EPA as Section 4.2 of the OAPQS Control Cost manual.

Table A-9 in Appendix A presents the analysis of the incremental economic impact of the SCR technology applied after consideration of the NO_X reduction from the DLN design.

Summary of Economic Impacts for NO_x Control Technologies

Table A-10 in Appendix A summarizes the combined and incremental economic impacts of these NO_X control technologies.

Energy Impact Analysis of NO_x Control Technologies

The energy requirements for the SCR are reflected in the economic impact analysis and are restated here. Minor impacts include the amount of electricity to run the ammonia pumps and exhaust fans. More significant energy impacts are associated with the backpressure on the CT associated with the SCR. This is estimated to create a pressure loss of approximately 3 inches of water resulting in a performance loss of approximately 0.32%. For the anticipated CT, this yields a power loss of 5,002,791 kWh per year. With a CT gross heat input rate of 1876 MMBtu/hr, a heat rate increase from the pressure loss generates a fuel penalty of 51,766 MMBtu per year or approximately 51.5 million cubic feet (mmcf) per year of natural gas.

Environmental Impact Analysis of NO_x Control Technologies

Numerous collateral environmental issues have been raised in association with the use of SCR technology. In general, these include:

- Increased ammonia emissions associated with ammonia slip of the SCR can occur at levels of 5 to 10 ppmv. In terms of nitrogen emitted, 1 ton of ammonia equals 1.7 tons of NO and 2.7 tons of NO_2. Both ammonia and NO_X are known to be acutely toxic, contribute to fine particle formation, acidifying deposition, eutrophication, and enrichment of terrestrial soils, and both may be converted to nitrous oxide, a powerful greenhouse gas. In a recent draft policy statement, the EPA analyzes these issues more thoroughly and concludes that in some situations – more so where nitrogen deposition and eutrophication are of concern – it may be preferable to limit ammonia emissions over NO_X emissions.
- Backpressure losses from SCR necessitate providing additional electrical generating capacity to meet demand. This demand is either satisfied through increased electricity production at older "higher emitting" plants or through

construction of additional units. The implications of requiring SCR on combined cycle turbines was analyzed by EPA's Office of Air and Radiation using the Integrated Planning Model – a tool used extensively by EPA to analyze emissions reductions and costs for the electric power industry under a variety of policy options.

- EPA identifies ammonia as an extremely hazardous substance and is an OSHA regulated substance. Facilities that handle over 10,000 pounds of anhydrous ammonia or 20,000 pounds of ammonia in an aqueous solution must prepare and implement a Risk Management Plan to prevent accidental releases. The Chemical Emergency Preparedness and Prevention Office (CEPPO) received RMPs from 97 electric generating facilities. Since 1992, six accidental releases were reported from three of these facilities using ammonia for catalytic control.
- The use of SCR systems results in spent catalyst waste. The amount of waste generated is dependent on the amount of catalyst used, the life of the catalyst, the quality of fuel and combustion air, and the amount of available recycling options. Typically, catalysts do not need to be replaced more than once every three years. Spent catalyst is not a hazardous waste.

Selecting the Remaining Available NO_x Control Technology (BACT)

After eliminating control alternatives that are not technically feasible in the proposed design and CT application, the most effective NO_X control technology is the use of Selective Catalytic Reduction (SCR). DLN combustion will be implemented with natural gas firing and water/steam injection will be utilized for fuel oil firing. The economic impact of DLN and Natural Gas Combustion were in an amount generally considered acceptable. The incremental economic impact of the SCR alone was determined to be $2,360 per ton of NO_X removed, which is consistent with BACT determinations as listed in the RBLC. The adverse environmental impacts associated with SCR should be given serious consideration, though. A review of technical literature including EPA sources identified numerous concerns that offset the apparent benefits of SCR. Most notably is the EPA report suggesting that a policy of presumptively adopting SCR may actually result in a net region or nationwide increase in NO_X emissions. To achieve the 3.0 ppmvd, an ammonia slip of 10 ppmvd should be anticipated. Ammonia slip can be reduced to 7 ppmvd with a corresponding increase of NO_X emission concentration of 3.5 ppmvd. Such a determination would remain consistent with other BACT determinations as listed in this application. This application is prepared with the determination that a NO_X concentration of 3.0 ppmvd can be achieved with SCR and DLN and has therefore been determined as BACT. At the discretion of the agency, a 3.5 pmvd may be determined more appropriate given these considerations.

Formation of CO

Carbon Monoxide (CO) – as well as VOC emissions – result from incomplete combustion. CO results when there is insufficient residence time at high temperature or incomplete mixing to complete the final step in fuel carbon oxidation. The oxidation of CO to CO_2 at gas turbine temperatures is a slow reaction compared to most hydrocarbon oxidation reactions. In gas turbines, failure to achieve CO burnout may result from quenching by dilution air. With liquid fuels, this can be aggravated by carryover of larger droplets from the atomizer at the fuel injector. Carbon monoxide emissions are also dependent on the loading of the gas turbine. For example, a gas turbine operating under a full load will experience greater fuel efficiencies, which will reduce the formation of carbon monoxide. The opposite is also true, a gas turbine operating under a light to medium load will experience reduced fuel efficiencies (incomplete combustion), which will increase the formation of carbon monoxide.

The CT anticipated for this project has a manufacturer reported CO emission concentration of 10 ppmvd when firing both natural gas and fuel oil.

Identification of Carbon Monoxide Control Technologies

Options for control of CO emissions are more limited than what is available for controlling NO_X emissions. A review of the RACT/BACT/LAER Clearinghouse (RBLC) identifies combustion control and catalytic oxidation as the two available techniques for CO control. Good combustion practices are the selected alternative.

Good Combustion Practice

Good combustion practice and control is a stated goal of the CT design approach. CO emissions from a conventional gas turbine combustion systems are 10 ppmvd at loads down to 75 percent for steady-state operation. As firing temperature is reduced below about 1,500°F, the CO emissions increase quickly. During ignition and acceleration, there may be transient emission levels at rates higher than 10 ppmvd.

Selecting the Remaining Available CO Control Technology (BACT)

The BACT analysis concludes with the determination that an oxidation catalyst is not economically feasible and that good combustion practices be selected as BACT. The economic impact of the CO catalyst system at $11,420 per ton of CO removed is higher than historic cost-effectiveness thresholds including the reported $3,000 per ton for the Lakefield Junction, Minnesota facility. The removal of 93.13 tons of CO with an oxidation catalyst would require an initial capital investment of $1.94 million with an annualized catalyst replacement cost of $413,505 per year. Therefore, it is reasonable to determine that an oxidation catalyst system creates an economically unacceptable burden. This conclusion is consistent with recent BACT determinations for other CT facilities. The use of good combustion controls designed within the anticipated turbine performs at a rate of 10 ppmv, which is equivalent to or better than other BACT performance levels reported in the EPA RBLC and as reported for Minnesota by the EPA Region IV database. Furthermore, the use of an auxiliary boiler to facilitate a "warm-start" will lower CO emissions during start-up.

Formation of VOC

The pollutants commonly classified as VOC can encompass a wide spectrum of volatile organic compounds, some of which are hazardous air pollutants. Often referred to as "unburned hydrocarbons" (UHCs), these compounds are discharged into the atmosphere when some of the fuel remains unburned or is only partially burned during the combustion process. With natural gas, some organics are carried over as unreacted, trace constituents of the gas, while others may be pyrolysis products of the heavier hydrocarbon constituents. With liquid fuels, large droplet carryover to the quench zone accounts for much of the unreacted and partially pyrolized volatile organic emissions.

The emissions of VOC's are almost solely associated with the start-up and shutdown of the CT. At normal operating conditions, VOC emissions are very low, 1.82 lb/hr when firing natural gas and 12.99 lb/hr when firing fuel oil. During start-up, the VOC emissions are estimated to be 792.22 lb per start-up/shutdown sequence (229.63 lb/hr) when firing natural gas and 4,110.61 lb per start-up/shutdown sequence (1191.48 lb/hr) when firing fuel oil. These rates are for a warm start, which takes approximately 2.7 hours to complete and 0.75 hours to shutdown the turbine for a total of 3.45 hours per start-up/shutdown sequence. Because the CT could start-up and shutdown once a day, the potential VOC emissions can be very large.

Identification of VOC Control Technologies

With the exception of increased design efficiencies, there are also no direct UHC reduction control techniques used within the gas turbine. The same indirect emissions control techniques can be used for unburned hydrocarbons as for carbon monoxide. Abatement of VOC emissions can be achieved with post-combustion oxidation techniques such a thermal or catalytic oxidation. Other VOC control techniques such as carbon absorption or recovery are not applicable to flue gas treatment, especially with the exhaust rates associated with the anticipated CT.

In addition to the oxidation catalyst system reviewed for the CO control, thermal incineration is another control technology that is applied for VOC control. Since the primary source of VOC emissions is unburned hydrocarbon during start-up, the same technical limitations of the catalytic oxidation apply to controlling VOC start-up emission as for CO – primarily the low exhaust temperatures not being sufficiently hot enough to activate the catalyst.

Selecting the Best Remaining Available VOC Control Technology (BACT)

Because of the large additional heat input requirement, thermal oxidation is not a feasible control option. Therefore, good combustion practices are presented as BACT for the combustion turbine.

Formation of PM_{10}

PM_{10} emissions (particulate matter that is less than or equal to 10 micrometers in aerodynamic diameter) from turbines primarily result from carryover of noncombustible trace constituents in the fuel. PM_{10} emissions are generally considered negligible with natural gas firing and marginally significant with distillate oil firing because of the low ash content. However, because of the large size of the proposed facility, these "negligible" amounts have the potential to cumulatively exceed the PSD significance threshold. The principal components of the particulates are smoke, ash, ambient non-combustibles, and erosion and corrosion products. Two additional components that could be considered particulate matter are sulfuric acid and unburned hydrocarbons that are liquid at standard conditions.

PM emissions can be classified as "filterable" or "condensable". Filterable PM is that portion of the total PM that exists in the stack in the solid or liquid state and can be measured on an EPA Method 5 filter. Condensable PM is that portion of the total PM that exists as a gas in the stack but condenses in the cooler ambient air to form particulate matter. Condensable PM exists as a gas in the stack, so it passes through the Method 5 filter and is typically measured by analyzing the impingers, or "back half" of the sampling train. Condensable PM is composed of organic and inorganic compounds and is generally considered all less than 1.0 micrometers (mm) in ærodynamic diameter. Because natural gas is a gaseous fuel, filterable PM emissions are typically low. Particulate matter from natural gas combustion is usually larger molecular weight hydrocarbons that are not fully combusted. Increased PM_{10} emissions may result from poor air/fuel mixing or maintenance problems. One EPA source provides the following particle size distribution for products of natural gas and distillate fuel oil combustions.

Identification of Fine Particulate Control Technologies

Since CT exhaust particulate emission rates are influenced by the design of the combustion system, fuel properties, and combustor operating conditions, the most readily available technique for PM_{10} control is to optimize these aspects of the CT operation. As stated in technology reviews for other pollutants, the anticipated turbine is state-of-the-art in optimizing combustion efficiency. In fact, upon review of the RBLC no other control technologies (preventive or abatement) were listed for PM_{10} control of CTs – especially those CTs primarily firing natural gas.

Nevertheless, there are several PM_{10} control technologies in use within the electric utility industry that can be considered here. It should be noted, however, that these abatement technologies are primarily used in coal-fired boiler service and that the particle size and distribution of the emissions from these sources are larger in mass than for gas or liquid fuel.

Possible PM_{10} controls are:

- Ultra Low Penetration Air (ULPA) Filter & High Efficiency Particle Air (HEPA) Filter
- Fabric Filters
- Dry Electrostatic Precipitators (ESP)
- Packed-Bed Scrubbers
- Venturi Scrubbers
- Centrifugal Collectors (Cyclones)

Selecting the Remaining Available PM_{10} Control Technology (BACT)

Based on the BACT analysis, the likely control technologies are the ESP and the Fabric Filter. The annualized cost-benefit of the ESP and Fabric Filter are $37,567 per ton and $13,251 ton of pollutant reduced respectively. Given the very high economic impact of either PM_{10} abatement control systems it is apparent that add-on control is not feasible. The use of good combustion practices designed within the anticipated CT is the best available control technology for this facility. This technology selection is consistent with other BACT determinations for similar CTs.

Formation of SO_x

The gas turbine itself does not generate sulfur, which leads to sulfur oxides (SO_X) emissions. All sulfur emissions in the gas turbine exhaust are caused by the combustion of sulfur introduced into the turbine by the fuel, air, or injected steam or water. However, since most ambient air and injected water or steam has little or no sulfur, the most common source of sulfur in the gas turbine is through the fuel. Due to the latest hot gas path coatings, the gas turbine will readily burn sulfur contained in the fuel with little or no adverse effects as long as there are no alkali metals present in the hot gas.

Experience has shown that the sulfur in the fuel is completely converted to sulfur oxides. Sulfur oxide emissions are in the form of both SO_2 and SO_3. Measurements show that the ratio of SO_2 to SO_3 varies. For emissions reporting, GE reports that 95% of the sulfur into the turbine is converted to SO_2 in the exhaust. The remaining sulfur is converted into SO_3. SO_3 combines with water vapor in the exhaust to form sulfuric acid. This is of concern in most heat recovery applications where the stack exhaust temperature may be reduced to the acid dew point temperature. Additionally, it is estimated that 10% by weight of the SO_X generated is sulfur mist.

For this application, SO_X and SO_2 will be considered synonymous.

Identification of Available SO2 Control Technologies

There are two ways to limit SO_2 emissions. The first is to control the amount of sulfur entering the combustion system and the second is to abate the SO_2 emission from the exhaust. The facility proposes using natural gas as its primary fuel source with low sulfur No. 2 fuel oil as an alternate fuel.

Available control technologies are:

- Limiting Sulfur Content
- Wet Flue Gas Desulfurization (FGD) Spray Tower Scrubber
- Dry Flue Gas Desulfurization Technologies

Limiting Sulfur Content

There is currently no internal gas turbine technique available to prevent or control the sulfur dioxides emissions from forming in the gas turbine. Control of sulfur dioxide emissions has typically required limiting the sulfur content of the fuel, by either lower sulfur fuel selection or fuel blending with low sulfur fuel.

Natural gas supplies available in the area have a typical sulfur content of 0.8 grains per 100 cubic feet or 0.0033% by weight. Low sulfur No. 2 fuel oil will be used by the facility. Low-sulfur fuel oil, a.k.a. “on-road distillate” has a specification of 0.05% sulfur by weight. Regulations effective for 2006 will require that refiners produce No. 2 Fuel oil to a 0.0015 percent sulfur content, which is lower than the current natural gas specification. As this “ultra-low” distillate becomes available in 2006, the use of this fuel at the facility becomes feasible. (Note: 2006 is the anticipated start date of the facility)

Technical Feasibility of Control Options

The use of natural gas and low sulfur No. 2 fuel oil (on-road) is planned for this facility. As previously mentioned, the availability of ultra-low sulfur fuel oil will not be mandated by regulation until 2006, which is concurrent with the planned commissioning of this facility and therefore predicting its availability is uncertain at this time.

Selecting the Remaining Available SO_2 Control Technology (BACT)

Given the high economic impact of any of the FGD technologies available, it would appear that add-on control is not practicable. Furthermore, the need of a SO_2 control system will only be necessary as a short-term control until the reduced sulfur (0.0015 percent) fuel oil is available in 2006. As such, it is recommended that the planned use of low-sulfur No. 2 fuel oil (0.05 percent S) be selected as BACT. This technology selection is consistent with other BACT determinations for similar CTs firing fuel oil.

Formation of Hazardous Air Pollutants

Available data published by manufacturers and confirmed in practice indicate that emission levels of HAPs are lower for gas turbines than for other combustion sources. This is due to the high combustion temperatures reached during normal operation. The emissions data also indicate that formaldehyde is the most significant HAP emitted from combustion turbines. For natural gas fired turbines, formaldehyde accounts for about two-thirds of the total HAP emissions. Polycyclic aromatic hydrocarbons (PAH), benzene, toluene, xylenes, and others account for the remaining one-third of HAP emissions. For No. 2 distillate oil-fired turbines, small amount of metallic HAP are present in the turbine's exhaust in addition to the gaseous HAP identified under gas-fired turbines.

These metallic HAP are carried over from the fuel constituents. The formation of carbon monoxide during the combustion process is a good indication of the expected levels of HAP emissions. Similar to CO emissions, HAP emissions increase with reduced operating loads. Typically, combustion turbines operate under full loads for greater fuel efficiency, thereby minimizing the amount of CO and HAP emissions.

Control of Hazardous Air Pollutants

The EPA is in the rulemaking process for determining Maximum Available Control Technology (MACT) requirements applicable to facilities that are a major source of HAP emissions. While the Faribault Energy Park will be significantly below the major source thresholds for any individual HAP or aggregate HAP total, it is important to note that the considered combustion turbine's performance is consistent with what may be the promulgated performance requirement for HAPs.

On August 21, 2001, EPA issued a memorandum indicating, "HAP emissions from lean premix stationary combustion turbines are equivalent or lower than HAP emissions from diffusion fan stationary combustion turbines equipped with oxidation catalyst systems. Thus, lean premix combustion technology is a comparable technology to oxidation catalyst."

The Faribault Energy Park intends to permit the facility as a synthetic minor source; with continuous emissions monitoring equipment in place to ensure the facility does not exceed applicable threshold limits. Air permits were submitted November 18, 2002.

Air Toxics Review

Because the fuel for the turbine and the auxiliary boiler will be fired by natural gas only, and the facility wide emissions of pollutants are below federal permitting thresholds, an MPCA Air Toxics Review will not be required specifically for this project. This determination is in accordance with MPCA guidance for natural gas combustion sources and has been confirmed by the MPCA Majors Air & Construction Section.

Associated Regulatory Requirements

New Source Performance Standards

Pursuant to Section 111 of the CAA, the EPA issued NSPS rules in 40 CFR Part 60 for specific sources. In particular, 40 CFR Subpart GG -- *Standards of Performance for Stationary Gas Turbines* and Subpart Kb -- *Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984* are potentially applicable to the Faribault Energy Park project. These rules limit emissions from sources, and require testing, monitoring, record keeping, and reporting requirements to determine compliance with those limitations. Table A-12 in Appendix A includes the emission limitations required by the NSPS for the facility:

Faribault Energy Park will be installing two 350,000-gallon fuel oil tanks. 40 CFR Subpart Kb applies to storage tanks with a capacity larger than 40,000 gallons. However, storage tanks of this size holding a fuel with a vapor pressure lower than 3.5 kPa are exempt from the NSPS requirements. Distillate fuel oil has a vapor pressure of less than 1 kPa at 100 degrees Fahrenheit. Since this is the only liquid that will be stored in these tanks, Subpart Kb does not apply.

Acid Rain

Title IV of the CAA Amendments was established to reduce the amounts of acid forming pollutants, specifically SO_2 and NO_x emissions, emitted to the atmosphere. EPA implemented Title IV of the CAA through rulemaking that established a sulfur dioxide emission cap and trade system, a nitrogen oxide emission reduction program, a permitting program, and a detailed monitoring plan for utilities. The Acid Rain program applies to any new fossil fuel fired utility, constructed after November 15, 1990, and has an electrical output capacity of 25 MW or more. Faribault Energy Park will be subject to the Acid Rain provisions, and will supply the appropriate documentation subsequent to the issuance of the construction permit.

Water Quality

Stormwater

The potential project area is relatively flat. Construction of the power plant will slightly affect the topography of both sites. Construction will level the project sites to allow for construction of the plant and buildings. Addition of impervious surfaces such as buildings, roads, and parking area will create additional stormwater runoff. The impact on erosion will be low since the sites are nearly flat.

The facility will be required to follow an MPCA issued storm water management plant that meets applicable standards. This stormwater management plan could include construction of a stormwater retention basin, or diversion of stormwater into created wetlands intended to be constructed for management of wastewater effluent.

Upon completion of the facility, the client must comply with several MPCA water quality standards. Included among these are the permits for surface water discharge, stormwater discharge, and wastewater discharge. Stormwater permits are applicable for both the construction and industrial phases of the project.

Storm Water Pollution Prevention Plan

A Stormwater Pollution Prevention Plan will be prepared for the Facility in compliance with coverage under Minnesota NPDES General Industrial Stormwater Discharge Permit MN G611000. The plan will identify potential pollutant sources at the Facility, outline operating procedures for material handling activities, and describe controls and best management practices that will be implemented to minimize pollutants in stormwater runoff. In addition to the stormwater management provisions described above, management practices will also include storage of chemicals indoors or within appropriate containment areas, good site housekeeping practices, and proper disposal of any waste materials.

Erosion and Sediment Control

The potential project area is relatively flat with no steep slopes or highly erodible soils. Approximately 37 acres of the site will be graded as part of the site development process. Vegetation and topsoil will be removed and stockpiled on the site for later use upon completion of rough grading operations. It is anticipated that soil excavated during site development will be utilized elsewhere on the site. If any of the excavated material is found to be unsuitable for use on the site, it will be hauled offsite and placed in a designated upland area.

Since the Facility will disturb more than five acres of land, a permit application for coverage under Minnesota NPDES General Stormwater Discharge Permit MN R110000 is required and will be submitted to the MPCA prior to construction. The permit application certifies that temporary and permanent erosion and sediment control plans have been prepared and implemented to prevent soil particles from being transported offsite. Stormwater management will be in accordance with current industry practice, and will involved a number of strategies, including temporary vegetation, creation of temporary stormwater holding ponds, installation of silt fences, and installation of hay bales.

Under existing conditions, total site surface water runoff is influenced by how much rainwater can infiltrate the ground before it becomes surface runoff. Based on power plant building and associated structure designs, impervious surfaces would be created where soil and vegetation once existed, and rain and surface runoff would not be able to infiltrate the ground in a natural manner. Impervious surfaces such as concrete, packed gravel roads and fabricated buildings would cause an increase in surface water runoff from the site into the unnamed tributary of the Cannon River.

The increase in volume and velocity of surface water runoff would most likely introduce more water and suspended solids, such as eroded soils, into the Cannon River tributary. To prevent this from occurring, the long-term storm water management plan would include plans for the on-site construction of devices or BMPs that would both slow down and detain surface runoff. Structures such as grass berms (filter strips) and storm water detention ponds would help settle out suspended solids and govern the velocity and volume of the surface runoff. On a regional scale preventing "flash" or "peak" runoff events from sites such as the proposed power plant would reduce overall runoff into surface waters in the area during periods of heavy rain or rapid snow melt events.

The proposed stormwater retention pond at the preferred site will be designed to meet the criteria set forth in the General Permit that requires a permanent wet sedimentation basin to treat stormwater runoff from projects resulting in a net increase of more than one acre of impervious surface.

Groundwater

Water for the proposed facility will be supplied with wells from the Jordan bedrock aquifer underlying both sites, pending permit approval. Water demands for the facility will not exceed 1.94 million gallons per day instantaneous demand. Faribault Energy Park plans to apply for a groundwater appropriation permit from the MDNR for this amount of water to be withdrawn from the Jordan bedrock aquifer underlying the site. Preliminary calculations indicate such sustained withdrawal will have minimal impact on nearby groundwater use, confirmed by consultation with the MDNR (oral communication, September 2002). Faribault Energy Park will comply with all aspects of the groundwater appropriation permit. The estimated water quality of the Jordan Bedrock Aquifer water (provided by the MDNR) is detailed in A-13 in Appendix A. An explanation of the primary uses of the water resources is presented in A-14 in Appendix A.

Temporary site dewatering of the near surface groundwater may be required to facilitate excavation of building foundations and underground utility installation work. If dewatering is required, appropriate permits will be obtained from the MDNR. Temporary dewatering is expected to have a minimal impact on groundwater levels outside of the project site.

Floodplains

According to maps requested from the Federal Emergency Management Agency, the site is not within a recognized floodplain, and does not appear to have the ability to contribute significant flow to any receiving stream hydraulically connected to a floodplain. The project site is situated at an elevation of an average 1,014 feet above sea level. Impact on floodplains by construction of the facility is negligible and mitigation efforts are not necessary

Wetlands

A wetland screening report is included in Appendix C.

Section 6

Fish and Wildlife Resources

Wildlife inhabiting the project and adjacent area is typical of that found in rural areas of Rice County. The natural habitat within the project area is used by a variety of mammals including: eastern cottontail, striped skunk, whitetail deer, black bear, porcupine, eastern chipmunk, red fox, several species of mice, squirrels, and weasels. Sandhill crane, heron, waterfowl, shore birds, red-winged blackbird, meadowlark, bobolink, red-tailed hawk, common gackle, and American kestrel are a few of the bird species found in and around the project area. Amphibians and reptiles located within the area include garter snakes, gray tree frogs, American toads, and the chorus frog (MDNR 2002).

The land is already disturbed by agricultural activities. Impacts on wildlife are expected to be minor. The loss of cultivated land will reduce food sources for deer, rabbit, squirrels, raccoons, and small mammals as well as some bird species. Direct wildlife losses from construction (animals or eggs destroyed by construction vehicles) will be confined to small mammals and the eggs, or young of ground nesting birds. These losses are expected to be minor. Aquatic life in area streams and drainageways may be temporary affected by increased silt loads if heavy rains occur before surface restoration is complete. Mitigative measures will be taken in accordance with applicable regulatory requirements to minimize this possibility. Any impacts to aquatic life are expected to be both minor and temporary.

It is not anticipated that the Project would have a significant impact upon the species present in the area. All wildlife species that may be displaced are considered “common” in Minnesota, and their displacement would not be detrimental to their populations. No mitigation measures are necessary.

Vegetation

The vegetation located around the potential project area is primarily that of both a native prairie land and a deciduous, Maple-Basswood forest. Side-oats gramma, grayhead coneflower, purple coneflower, rough blazing star, and big blue stem are just a few of the native prairie species. Some of the species found within the deciduous forest are sugar maple, red oak, basswood, and oak, and a few underlying shrubs.

Construction activities like clearing, excavation, filling, and paving would remove agricultural crop land from production and realign the area topography in accordance with construction requirements. Individual plants and animals and local populations of some species might be affected, but not the stability of any species as a whole in Minnesota.

Storm water management permit would require use of proper erosion control methods during construction. This should prevent unnecessary erosion and the resulting deposits of soil and dust that could affect nearby waterways and their vegetation.

The potential project area is already disturbed by agricultural activities and the vegetation lost due to the proposed project will include the cultivated field and surrounding vegetation lining the property lines and drainage ditches. Depending on the specific layout of the facility buildings, some of the grub areas around the potential project area that contain larger trees may be able to be salvaged. Affects on vegetation are of little real consequence except as they relate to wildlife and their habitat as already discussed.

The vegetation within the study area is also important as it serves to impede and/or filter runoff from areas of erosion. Surface restoration, reseeding, and natural invasion will replace areas of vegetation important for erosion control, which will be lost during construction. Erosion control devices will control all surface runoff during construction.

It is not anticipated that the project would have a significant impact upon the species present in the project area regardless of the site selected.

Rare and Unique Natural Resources

The potential project area is located primarily on native prairie land and is relatively close to a Maple-Basswood forest. This, therefore, provides a suitable habitat for some species listed as threatened or endangered by the MDNR. As documented by the U.S. Fish & Wildlife Service (USFWS), Region 3, no federally threatened or endangered animals are know to reside in the immediate area of the Project, but two plant species have been observed and documented in the general Faribault area. Appendix C contains correspondence with the USFWS. The two plant species are the Minnesota dwarf trout lily and the prairie bush clover.

The Minnesota dwarf trout lily (*Erythronium propullans*) is listed as endangered in the general Faribault area. This plant favors woodland habitats, and is commonly found growing along the slopes of watersheds and tributaries dominated by much larger trees such as elm and maple. The plant flowers in the early spring (late April through early June), and loses its leaves as the woodland canopy develops and begins blocking out any summer light. It is thought that this plant occupies less than 600 acres of woodland habitat in Minnesota.

Lespedeza leptostachya, commonly know as the prairie bush clover, is listed as threatened within the state of Minnesota. Rice County has been a documented home to this particular species of plant. The prairie bush clover is a legume and is found primarily within tall-grass prairie habitat.

Other Resources

Minnesota's Wildlife Management Areas (WMA) are home to numerous animals. Wildlife Management Areas exist in 86 out of the 87 counties though primarily in the western part of the state. Several WMAs are located within a four-mile radius of the potential project area as well as one scientific and natural area just two miles east of the project potential project area. WMA provide habitat for a variety of species. In addition this area also provides recreation for the citizens of the state by offering hunting and wildlife watching. These WMA are remote to the project location and are not anticipated to be impacted by the project.

Environmental Justice

There are only a few private homes surrounding the project area, which is currently used as farmland. The families living in these homes and the citizens of Faribault are the people that will be affected by the construction and operation of a power plant. According to information from the 2000 Census, there is not a significant percent of low-income, Native American, or minority persons within the project area. There is no reason to suspect that there will be any disproportionately high or adverse effects on these populations.

Unavoidable Impacts and Mitigation

Noise Impacts – The largest noise impacts will likely be temporary during construction. Mitigation measures for noise during construction include limiting work hours to daytime hours, use of properly muffled and maintained construction equipment, and controlling traffic during peak construction periods to minimize noise on adjacent public roadways. As discussed earlier, noise analysis indicates operational noise of the facility will be within applicable regulatory requirements. The preferred site delineated earlier will have lower effect on receptors, as it is farther from the nearest receptor than the alternative site.

Low frequency noise and vibration have been identified in some CTs. It is felt as a vibration or rattling of structures and is not clearly identifiable when measuring or estimating sound using the A-weighted decibel scale. Airborne sound waves in the frequency range below 40 Hz, if high enough in magnitude, can couple with building frame walls and windows and cause vibration.

The vibration problem occurs with simple-cycle CT plants, but generally not with combined cycle CTs such as the proposed Project. The CTs discharge their exhaust gases directly to the atmosphere through exhaust silencers, which do not silence well below 40 Hz. Most large simple cycle CTs create very high levels of acoustic energy below 40 Hz, and this energy can radiate as airborne waves and easily propagate over large distances. In combined-cycle plants, such as the proposed Project, the turbine exhaust gases are directed through a heat exchanger system and HRSG rather than to the atmosphere directly through an exhaust silencer. The exhaust gases lose energy in the boiler tubes. Low frequency exhaust noise is reduced to very low levels, and vibration problems do not appear.

Aesthetics – The character of the proposed structure does not lend itself to significant measures to alter its appearance. Reducing stack height is not feasible for engineering and operational reasons, as well as air permit requirements for dispersion. Faribault Energy Park plans significant landscaping and the creation of a wetlands, as described in Section 2. Wetlands creation and the associated interpretive park are an option at the preferred site, but are not available at the alternative site due to topographic and footprint considerations. Conceptual layout and landscape architecture for the preferred site are presented in a rendering titled Faribault Energy Park at the end of Section 2.

Soils – Organic surface soils will be stripped and reserved for creation of a wetlands and for reuse at the site if possible. Soil erosion during construction will be addressed by appropriate control measures as described in Section 2, in accordance with applicable regulatory requirements and good construction practice. Following completion of construction, the entire area will be revegetated and maintained by the project owner.

Groundwater – All compounds that have the potential to contaminate the groundwater when accidentally released during construction and operation of the facility will be stored and handled in a manner which complies with all applicable regulatory requirements and good environmental practice. To reduce the risk of release of potential fuel spills, a Spill Prevention Control and Countermeasure Plan, as previously described in Section 2. During construction, equipment fuels will be stored onsite in bermed areas, with appropriate spill protection.

Groundwater supply impacts from supply water withdrawal may have the potential to impact nearby well owners or the City of Faribault. Groundwater withdrawal will be in strict accordance with permit requirements, which will include a limit judged to prohibit interference with nearby wells. Water levels within onsite wells will be monitored to determine the status of groundwater levels, and the Faribault Energy Park will communicate with the City of Faribault to determine the status of water levels within their wells.

Surface Water – Stormwater discharges will be managed through a retention pond system regardless of site selected, although overflow may be directed to the created wetlands should the preferred site be constructed. Stormwater management conceptual plans for the preferred alternative are depicted in a rendering titled Faribault Energy Park presented at the conclusion of Section 2. Should the alternative site be selected, stormwater overflow will be directed under applicable permit to an unnamed perennial stream bisecting the project site. Spent cooling water will be directed under permit to a created wetlands, also depicted in the aforementioned figure. All discharges will be managed in accordance with applicable regulatory requirements.

Air – Emissions of air pollutants will occur as a result of combustion of fuels from several sources within the proposed facility. The primary source of combustion-related emissions is the combined-cycle gas turbine. Secondary combustion sources include an auxiliary boiler, an emergency generator and a fire pump engine. The combustion turbine and auxiliary boiler will be fueled by natural gas, while the emergency generator will be fired by fuel oil. Other non-combustion emission sources include fuel-oil storage tanks, a cooling tower, and traffic/roadway related fugitive emissions.

Selection of natural gas as the primary fuel is the main mitigative measure for impact to air. Additional control technologies include Selective Catalytic Reduction (SCR) to reduce NO_x emissions to permit levels. Air emissions will be managed under permit, and will be monitored through a continuous emissions monitoring system to ensure compliance.

The release of fugitive dust during construction will be temporary. During periods of high wind or otherwise dry weather, dust emissions may pose a control issue. During these times, dust will be managed by altering construction practices or applying water or other dust control materials to dust sources. Following completion of construction, the site will be landscaped.

Section 7

References

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3. City of Faribault, “Land Use Plan – West Side”, 1998.

4. US Census Bureau, 2000 Census, http://censtats.census.gov/data/MN/1602720546.pdf.

5. Davis, Mackenzie L. and Cornwell, David A., Introduction to Environmental Engineering,3rd Edition, McGraw Hill Companies, 1998.

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   - http://www.dnr.state.mn.us/state_forests/map.html
   - http://images.dnr.state.mn.us/education_safety/education/geology/digging/minmap.gif

10. Faribault Fire Department Information, http://www.faribault.org/fire_code/index.htm

11. Faribault Police Department information. http://www.faribault.org/police/index.htm

12. Correspondence

    - Aug 7, 2002 Rebecca Wooden Minnesota Department of Natural Resources
    - U.S. Fish & Wildlife Service
    - Rice County Highway Department http://www.co.rice.mn.us/highway

Appendix A

Tables

Table A-1

Typical A-Weighted Sounds

Source	Sound Pressure Level (dB)
Jet Engine 25m Distance	140
Jet Take Off – 100 m Distance	125
Power Lawnmower	100
Average Street Traffic	85
Business Office	65
Conversational Speech	60
Living Room (No TV)	40
Bedroom	25

Source: Introduction to Environmental Engineering

Table A-1 (cont.)

Anticipated Equipment Sound Level Specifications

Source	Noise Source Components	Sound Pressure Level (dB)
CTG Package	Turbine Compartment, Ventilation Fans, Ductwork	Indoor
CT Inlet	CT Air Inlet	42 @ 400 ft.
HRSG Package	Boiler	65 @ 400 ft.
Steam Turbine Generator	Compartments, Fans, Piping	Indoor
Boiler Feed Pumps	Pump and Motor Assembly	90 @ 3 ft.
Generator Step-Up Transformers	Transformer and Fans	82 @ 3 ft.
Cooling Towers	Fans, Motors, Gearboxes, Water Splash	65 @ 400 ft.
Fuel Gas Metering Station	Pumps and Associated Equipment	50 @ 400 ft.

Source: Introduction to Environmental Engineering

Table A-2 Table State of Minnesota Noise Standards

NAC	Daytime (dBA)		Nighttime (dBA)	
	L_{50}	L_{10}	L_{50}	L_{10}
1 (Residential)	60	65	50	55
2 (Commercial)	65	70	65	70
3 (Industrial)	75	80	75	80

dBA = decibels, A-weighted scale; L_{10} = sound pressure level which is exceeded 10% of the time period; L_{50} = sound pressure level which is exceeded 50% of the time period.

Table A-3 Total Estimated Maximum Noise Levels for Typical Construction Equipment (dBA) Maximum Noise Level (dBA)

Construction Equipment	Typical Range at 50 Feet
Steam blow off (4-8-inch line)	124-134
Air blow off (4-8-inch line)	120-130
Dozer (250-700 hp)	85-90
Front end loader (6-15 yard 3)	86-90
Trucks (200-400 hp)	84-87
Grader (13-16’ blade)	83-86
Portable generators (950-200 kW)	81-87
Derrick crane (11-20 T)	82-83
Mobile cranes (11-20 T)	82-83
Concrete pumps (3-150 yard 3)	78-84
Tractor (3/4-2 yard 3)	77-82

Table A-3a
Faribault Energy Park
Existing Background Sound Pressure Levels (dBA) Measured at Preferred Site Periphery during the Ambient Noise Survey

ID*	During Daytime Hours [1]		During Nighttime Hours [2]	
	Max/Min	**Audible Noise Sources**	**Max/Min**	**Audible Noise Sources**
1 – West	58 dBA/ 54 dBA	Intermittent local traffic, steady distant traffic (I-35), intermittent aircraft, birds, insects	58 dBA/54 dBA	Distant traffic, insects, and intermittent local traffic.
2 – North	58 dBA/ 54 dBA	Intermittent local traffic, distant traffic, occasional aircraft, birds, insects	55 dBA/ 54 dBA	Distant traffic, birds, insects
3 - East	55 dBA/ 54 dBA	Local traffic, occasional aircraft, birds, insects	55 dBA/ 54 dBA	Intermittent local traffic, distant traffic, birds, insects
4 - South	58 dBA/ 54 dBA	Intermittent local traffic, Distant traffic (I-35), intermittent aircraft, birds, insects	55 dBA/ 54 dBA	Distant traffic, birds, insects

NOTES

1. Daytime hours are considered 7:00 a.m. to 10:00 p.m.
2. Nighttime hours are considered 10:00 p.m. to 7:00 a.m.

Table A-4 Prime Farmland Soils in Project Vicinity

Soil Name	Soil Unit Cost
Hayden Loam	104 B
Cordova Clay Loam	109
Glencoe Clay Loam	114

Source: Rice County Soil Survey

Table A-5 Project Site Soil Types

Map Symbol	Soil Unit
109	Cordova clay loam, 0-2%
104B	Hayden Loam 2-6%
104C2	Hayden Loam 6-12% Eroded
114	Glencoe clay loam, depressional 0-1%

Table A-6 Summary of Air Pollutants

Potential Emissions of Criteria Pollutants

Pollutant	CAS#	Emissions TPY
Nitrogen Oxides (NO_x)	10102-43-9	106
Carbon Monoxide (CO)	630-08-0	579
Particulate Matter < 10 Microns (PM_{10})	-	434
Volatile Organic Compounds (VOC)	-	408
Sulfur Dioxide (SO_2)	7446-09-5	132
Lead	7439-92-1	0.035

Potential Emissions of Other Organic Pollutants

Pollutant	CAS#	Pollutant Emissions (Pounds per Year)
1,3-Butadiene	106-99-0	77.0
Acetaldehyde	75-07-0	601.2
Acrolein	107-02-8	9.6
Benzene	71-43-2	392.1
Dichlorobenzene	25321-22-6	0.4
Ethylbenzene	100-41-4	480.2
Formaldehyde	50-00-0	11,095.4
Hexane	110-54-3	627.6
Naphthalene	91-20-3	173.4
PAH	-	392.1
POM	-	2.4
Propylene Oxide	75-56-9	435.4
Toluene	108-88-3	1,957.4
Xylene	1330-20-7	961.2

Potential Emissions of Metal Pollutants

Pollutant	CAS#	Emissions (Pounds per Year)
Arsenic	7440-38-2	50.0
Beryllium	7440-41-7	1.8
Cadmium	7440-43-9	21.6
Chromium	7440-47-3	50.2
Manganese	7439-96-5	3,561.6
Mercury	7439-97-6	5.8
Nickel	7440-02-0	21.8
Selenium	7782-49-2	114.2

Table A-7 Available NO_X Prevention and Abatement Technologies for Gas Turbines

Abatement or Emission Control Principle or Method	Technologies Available	Efficiency
Reducing peak temperature (Prevention)	Natural Gas Reburning Low NO_X Burners Combustion Optimization Inject Water or Steam Reduced Air Preheat Catalytic Combustion	70-85%
Reducing residence time at peak temperature (Prevention)	Air Staging of Combustion Inject Steam	70-80%
Chemical reduction of NO_X (Abatement with SCR/SNCR) (Prevention with FR/LNB)	Selective Catalytic Reduction (SCR) Selective Non-Catalytic Reduction (SNCR) Fuel Reburning (FR) Low NO_X Burners (LNB)	70-90%
Oxidation of NO_X with subsequent absorption (Abatement)	Non-Thermal Plasma Reactor	No Data
Removal of nitrogen (Prevention)	Ultra-Low Nitrogen Fuel	No Data
Using a sorbent (Abatement)	Sorbent in Ducts	60-90%

Table A-8 SCR Design and Cost-Estimating Basis

Parameter	Value	Reference
SCR Equipment Life	20 years	Section 4.2 OAPQS Cost Control Manual
Catalyst Life	6 years	Section 4.2 OAPQS Cost Control Manual
Catalyst Volume	7699 ft^3	Section 4.2 OAPQS Cost Control Manual
Hours of Operation	8760 hr / yr	6260 hours natural gas and 2500 hours fuel oil
Baseline NO_X Emission w/DLN	690.64 ton/yr	NO_X Concentration of 25 ppmv (NG) & 42 ppmv (FO)
Post SCR Control NO_X Emissions	89.28 lb/yr	NO_X Concentration of 3 ppmv (NG) & 6 ppmv (FO)
Annual NO_X Reduction	601.36 ton/yr	690.64 ton/yr - 89.28 ton/yr = 87% Reduction
Raw Ammonia Usage	50.98 lb / hr	1:1 molar ratio NO_X to NH_3 plus 10 ppm NH_3 slip.
Ammonia Usage as NH_4OH	175.44 lb / hr	29% NH_3 by weight
Power for Controls	357.7 kW	Section 4.2 OAPQS Cost Control Manual
Catalyst Cost	\$240 / ft^3	Section 4.2 OAPQS Cost Control Manual
Ammonia Cost	\$0.101/ lb	Section 4.2 OAPQS Cost Control Manual
Catalyst Pressure Drop Penalty	3 in. W.C.	Engineering Calculation

Table A-9 Economic Analysis of SCR for Combustion Turbine

CAPITAL COSTS	COST ($)	ESTIMATING BASIS
Direct Capital Cost		
Direct Equipment Cost		
SCR Catalyst	$1,847,760	OAPQS Section 4.2, Eq. 2-50
SCR Housing & Framing	$184,776	10% SCR Catalyst Cost
Total Direct Equipment Cost (A)	$2,032,536	
Indirect Installation Cost		
General Facilities	$101,627	OAPQS, Section 4.2 Tbl 2.5 (0.05A)
Engineering and Home Office Fees	$203,254	OAPQS, Section 4.2 Tbl 2.5 (0.10A)
Process Contingency	$101,627	OAPQS, Section 4.2 Tbl 2.5 (0.05A)
Total Indirect Installation Cost (B)	$406,508	
Project Contingency (C) (15%)	$365,856	OAPQS, Tbl 2.5 (A + B)*0.15
Total Direct Capital Cost (TDCC)	**$ 2,804,900**	OAPQS, Tbl 2.5 (A + B +C)
Indirect Capital Costs		
Allowance for Funds During Construction (E)	$000	OAPQS, Tbl 2.5 (Assumed in TDCC)
Royalty Allowance (F)	$000	OAPQS, Tbl 2.5 (Assumed in TDCC)
Preproduction Cost (G)	$56,098	OAPQS, Tbl 2.4
Inventory Capital	$000	OAPQS, Tbl 2.5
Initial Catalyst and Chemicals	$000	OAPQS, Tbl 2.5 (Assumed in TDCC)
Total Indirect Capital Cost	**$56,098**	
Total Capital Investment (TCI)	**$ 2,860,998**	
Annualized Cost of Capital	**$ 270,058**	i=7% and n=20 years

Table A-9 Economic Analysis of SCR for Combustion Turbine (Continued)

ANNUAL COSTS	COST ($)	ESTIMATING BASIS
Direct Costs		
Operating Labor		
Operator	$ 000	OAPQS, Chapter 4.2, Page 2-45
Supervisor	$ 000	OAPQS, Chapter 4.2, Page 2-46
Maintenance	$42,915	OAPQS, Chapter 4.2, Eq. 2.46
Annualized Catalyst Replacement Cost	$387,652	OAPQS, Chapter 4.2, Eq. 2.50 Annualized Cost, n=6, i=7%
Utilities		
Electricity	$125,349	Engineering Calculations, 8760 hr/yr
Ammonia	$155,222	Engineering Calculations, 8760 hr/yr
Total Direct Annual Cost	**$711,138**	
Indirect Costs		
Overhead	$ 000	OAPQS, Chapter 4.2, Page 2-48
Administrative Charges	$ 000	OAPQS, Chapter 4.2, Page 2-48
Property Taxes	$ 000	OAPQS, Chapter 4.2, Page 2-48
Insurance	$ 000	OAPQS, Chapter 4.2, Page 2-48
Fuel Penalty (Heat Rate Increase)	$238,125	
Performance (Power Output) Loss	$200,112	
Total Indirect Annual Cost	**$438,237**	
Total Annual Costs	$1,149,375	
Capital Recovery (Annualized Cost of Capital)	$270,058	
Total Annualized Cost (per CT)	**$1,419,433**	
COST EFFECTIVENESS (per CT)	**$ 2,360 / ton**	601.36 tons/yr NO_X removed at an annualized cost of $1,419,433

Table A-10 Summary of Combined and Incremental Economic Impacts of NO_X Control Technologies

	Annual Emissions (ton/yr)	Annualized Cost ($/yr)	NO_X Reduction (ton/yr)	Combined Economic Impact ($/ton)	Incremental Reduction (ton/yr)	Incremental Economic Impact ($/ton)
Baseline (42 & 65 ppmv)	1123					
DLN (25 ppmv)	691	405,697	433	937		
DLN + SCR (3 ppmv)	89	1,825,130†	1,034	1,765	601	2,360

† Annualized cost of SCR + DLN = $1,419,433+ $405,697 = $1,825,130

Table A-11 Particle Size Distribution for Stationary Internal Combustion Sources

Natural Gas Combustion		No. 2 Fuel Oil Combustion	
Particle Size	Mass Distribution	Particle Size	Mass Distribution
<0.05 µm	15%	<1 µm	77.08%
<0.10 µm	40%	1 µm – 3 µm	0.20%
<0.15 µm	63%	3 µm – 10 µm	2.74%
<0.20 µm	78%	>10 µm	19.98%
<0.25 µm	89%		
<1.00 µm	100%		

Table A-12 Emission Limitations Required by the NSPS

Pollutant	Applicable Rule	Emission Standard	Applicable Source
NO_x	40 CFR 60.332	0.0103%* (103 ppmv)	CTG
SO_2	40 CFR 60.333	0.015%** (150 ppmv)	CTG

*Percent by volume, dry basis, 15% O_2 (Assume 51 degree F. ambient temp)

**Percent by volume, dry basis, 15% O_2

Table A-13 Estimated Water Quality of Jordan Bedrock Aquifer

Selected Constituent	Level
Iron, mg/L	18
Manganese, mg/L	0.0140
Sulfate, mg/L	94
Chloride, mg/L	1.6
Dissolved Solids, mg/L	497
Hardness as $CaCO_3$	400

Table A-14 Facility Water Balance (59 degree Fahrenheit Ambient Temperature)

Process	GPM
Raw Water Supply	1,037
Cooling Tower	1,033
Evaporative Loss	752
HRSG	29
Treated Effluent to Wetlands	284
Septic System	3

Appendix B

IMA Consulting Report

File Copy

August 7, 2002

Michael Donnelly
Project Manager
Stanley Consultants, Inc.
Oakdale Research Park
2658 Crosspark Road, Suite 100
Coralville, IA 52241-3212

RE: Phase I Cultural Resource Survey for the MMPA Project Permitting

Dear Mr. Donnelly,

I am pleased to submit the draft letter report for the above-mentioned project. The enclosed report documents the survey and provides a summary of results and recommendations. Please let me know if you have any comments or questions.

Thank you for the opportunity to work on the MMPA Project Permitting. We hope that you will consider IMA Consulting for future cultural resource projects. Feel free to call with any questions or for further information. I can be reached at (651) 848-0043 or by email at gabe@imnarch.com.

Sincerely,
IMA Consulting, Inc.

Gabe Bourgerie

Gabrielle Bourgerie
Operations Manager

Enclosures: Letter Report
Invoice

IMA Consulting, Inc. 750 Transfer Road St. Paul, MN 55114 TEL 651.848.0043 FAX 651.848.0059 www.imnarch.com

Project Description

Stanley Consultants, Inc. of Iowa contracted with IMA Consulting to conduct a Phase I cultural resource inventory of the MMPA project area. Phase I inventory included a pedestrian survey of the entire project area and limited subsurface testing designed to examine the geomorphological potential for intact subsurface archaeological deposits, as well as an architectural history survey of adjacent properties.

The MMPA project survey area comprises approximately 33 acres of cropland in the SE ¼ of the NE ¼ of Section 13, T110N, R21W in Rice County, Minnesota (Figure 1). A residential property comprising a farmhouse, barn, and outbuildings occupy approximately 2.3 acres in the northeast corner of the survey area (Figure 1). The residential area was excluded from the archaeological survey, but was included in the architectural history survey.

The gently rolling landscape of the survey area rises onto a knoll along the western edge of the survey area. The Cannon River is approximately 2,100 meters southeast of the survey area. The soils, which formed in friable glacial till on uplands, belong to the Lester and Hayden Series of loams and the Webster Series of clay loams (Carlson et al 1975). The Lester and Hayden Series supported a pre-settlement biome of deciduous forest while the Webster Series supported water-tolerant prairie grasses.

The survey area was planted in soybeans and corn at the time of the survey. Surface visibility ranged from 20 to 30 percent across the survey area, with the ground surface in the soybean fields visible between rows and within the rows as the crew moved plants aside. The surface visibility in the corn was uniform.

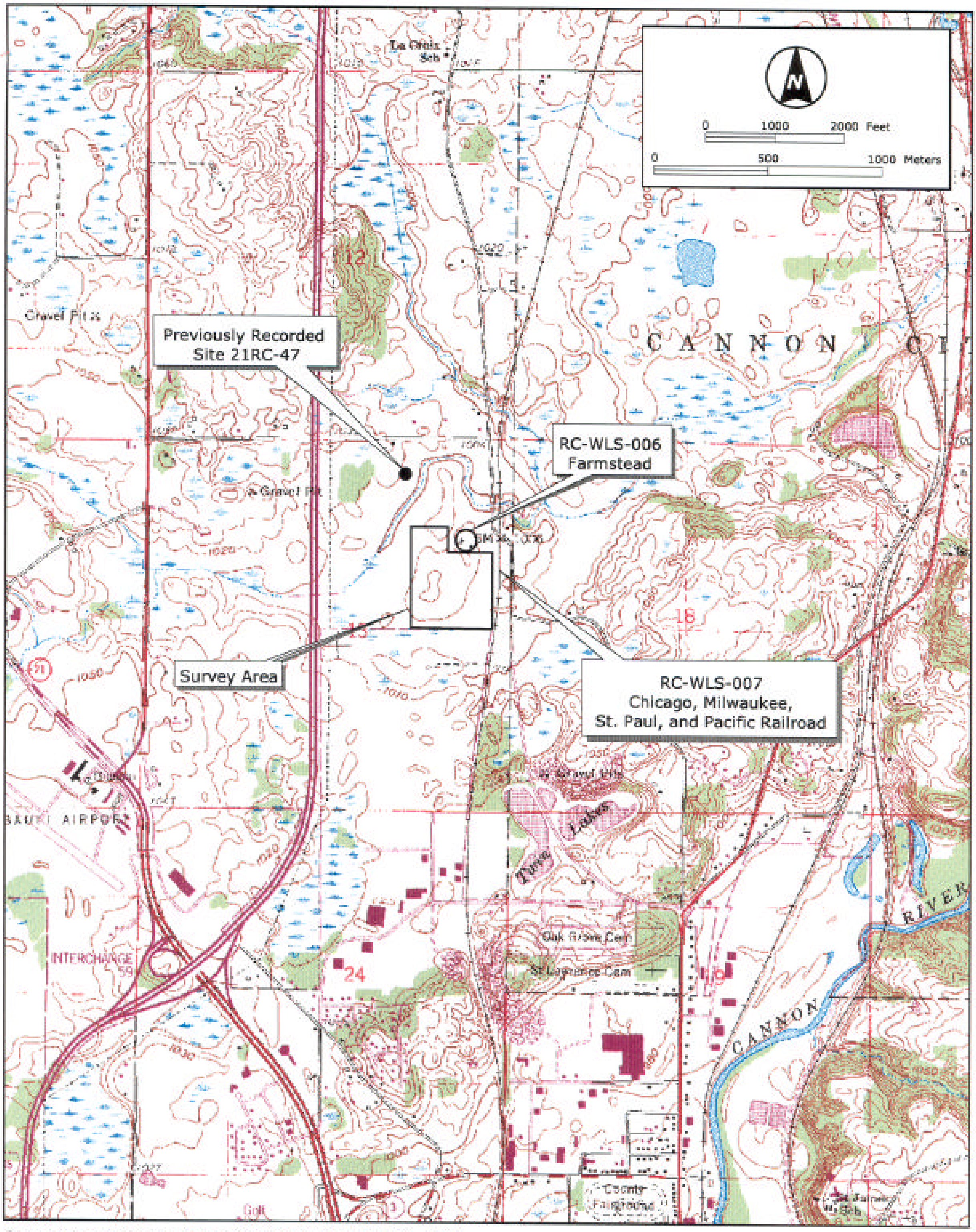
Previously Recorded Archaeological Sites

A review of site files and maps at the Minnesota State Historic Preservation Office (SHPO) verified that one archaeological site (21CR47) has been recorded within one mile of the MMPA project area. The site was identified during a 1996 pipeline survey that traversed the NW ¼ and NE ¼ of Section 13, adjacent to the survey area (Winham et al 1996). The 1996 pipeline survey encompassed a total of 177.36 acres near the MMPA project area and two sites were recorded, for a density of .01 site per acre. The 1996 survey is the only documented archaeological survey conducted in or near the project area.

Site 21CR47 comprises two flakes of "cream/gray banded chert" found on the surface in the NE ¼ of the NW ¼ of the NE ¼ of Section 13, approximately 230 meters northwest of the MMPA project area (Figure 1). The 21CR47 site area had been plowed into the subsoil and the site was recommended not eligible for listing on the National Register of Historic Places.

Previously Recorded Architectural Properties

No architectural resources have been recorded within one mile of the MMPA project area. Five reports on the architectural history of Faribault are on file at the SHPO (Downtown Association 1988; Granger and Kelley 1987; Hoisington 1994a, 1994b; Zahn 1988). None of the reports contains specific information on resources within a mile of the project area.



Source: 7.5 Minute U.S.G.S. Quadrangle: Faribault, 1991

Phase I Cultural Resource Survey
MMPA Project Permitting
Rice County, Minnesota

Project Location

Figure 1

Archaeological Survey Summary

Field personnel from IMA Consulting met Mr. Edwin Slattery of Stanley Consultants at the MMPA project area on July 23, 2002. The IMA Consulting crew included James Lindbeck (senior archaeological technician), and Thomas Madigan (geoarchaeologist). Gabrielle Bourgerie served as principal investigator and project manager. Mr. Slattery reviewed maps of the project area and showed the IMA Consulting crew the boundaries of the survey area. The area was approximately 70 percent soybean crop between one and two feet tall. Approximately 30 percent of the project area was in eight-foot tall corn. Soils in the eastern half of the area (soybean field) are the Webster Series of clay loam. This area has a very low archaeological potential because it is low and wet, and was drained for cultivation.

The corn crop occupied the highest terrain of the survey area and was the only portion that retained any pre-settlement topsoil. West of the corn crop, again in soybeans, the topsoil is eroded and the B-horizon (subsoil) is exposed on the surface. There is no potential for subsurface archaeological resources in this area.

The crew conducted a pedestrian survey of the project area at 10-meter intervals to assess conditions and identify cultural materials visible on the ground surface. Within the portion of the survey area planted in soybeans, the crew focused especially on areas where there were gaps in the crop cover. The survey technique in the soybean field also involved moving the plants to the side while walking to observe the surface. Survey transects were narrowed to 5-meter intervals in the cornrows because this area has the greatest archaeological potential and peripheral visibility was restricted. No cultural materials were identified during pedestrian survey.

After pedestrian survey, two shovel tests were excavated to examine the stratigraphy of the two landforms within the project area that were not wetland prior to cultivation. Shovel test one was excavated in soybeans near the eastern edge of the survey area. Shovel test two was excavated in corn on the high point of the survey area in corn. All excavated soils were screened though 1/4-inch mesh. Shovel test one revealed a complete absence of topsoil. The topsoil in shovel test two was still in place, although plowed into the subsoil. Shovel test profiles are provided below:

Shovel Test One Soil Profile

Depth (cm below surface)	Soil Description
0-15 Ap (plow zone)	Brown (10YR 4/3) loam
15-30 Bt	Dark yellowish brown (10YR 4/4) heavy loam

Shovel Test Two Soil Profile

Depth (cm below surface)	Soil Description
0-23 Ap (plow zone)	Very dark grayish brown (10YR 3/2) loam
23-30 Bt	Dark yellowish brown (10YR 4/4) heavy loam

No cultural materials were recovered during shovel testing.

Architectural History Survey Summary

The Phase I architectural history survey included the project area and all properties that front the project area, including the property within the "Exclusion Area." Two properties were identified as part of the architectural history survey: a farmstead (Site RC-WLS-006) and a railroad (Site RC-WLS-007). The survey was conducted simultaneously with the archaeological survey. Barbara Mitchell served as architectural historian.

Site RC-WLS-006

Site RC-WLS-006 is a farmstead that is located in the N ½ of the SE ¼ of the NE ¼ of Section 13, Township 110N, Range 21W. The site consists of five buildings: a single-family dwelling, barn, pump house, and two sheds of undetermined use. Based on the building style and a review of historic plat maps, the house and barn may have been built as early as the 1890s (see site form, attached).

Plat maps present some confusion as to who might have owned the property historically. On the 1900, 1915, and 1916 plat maps, the residence is depicted in the NE ¼ of the NE ¼ of Section 13, rather than in the SE ¼ of the NE ¼ (North West Publishing Company 1900; W. W. Hixson and Company 1916; Webb Publishing Company 1915). Based on the relationship between the residence and the bend in Acorn Trail on the plat maps, we can assume that the residence depicted on the historic maps is the same one associated with RC-WLS-006, even though it is depicted further north than it should be. The plat maps indicate that the residence (along with the rest of the NE ¼ of the NE ¼) was owned by S. G. Benedict in 1900 and 1916, and Jacob J. Friesen in 1915. The plats also indicate that the property in the SE ¼ of the NE ¼ of Section 13 was owned by William Friesen from 1900 through at least 1916. Local histories do not include information on either S. G. Benedict or Jacob J. Friesen. William Friesen had lived in Rice County for about 20 years when the 1915 plat map was published and Jacob Friesen for about 12 years (Webb Publishing Company 1916). No significant historical associations were found for any of the landowners.

Although the farmstead appears to date to the 1890s, most of the buildings have been altered and the farmstead as a whole is no longer intact. None of the individual buildings is a significant example of its property type and none is likely to be found eligible for individual listing on the National Register of Historic Places. The two primary buildings, the house and barn, no longer retain integrity of design, material, or workmanship. One of the sheds is altered significantly and the other appears to be barely 50 years old. Based on a comparison with a 1991 aerial photograph, the farmstead has lost at least one primary structure. The farmstead is no longer associated with the surrounding cropland, which is under separate ownership. Based on these considerations, the farmstead does not appear to retain sufficient integrity of design, setting, feeling, or association for listing on the National Register of Historic Places. No further work is recommended for Site RC-WLS-006.

Site RC-WLS-007

Site RC-WLS-007 is a one-mile segment of the Chicago, Milwaukee, St. Paul and Pacific Railroad. The segment passes north-to-south through the eastern quarter of Section 13, Township 110N, Range 21W. The edge of the railroad right-of-way borders the eastern edge of the project area. Few railroads in Minnesota have been evaluated for listing on the National Register of Historic Places and none have been recorded in Rice County. However, the SHPO generally considers the railroads that appear on the 1886 Railroad Map as being historically significant. The Chicago, Milwaukee, St. Paul and Pacific Railroad is depicted on the map, running from Minneapolis, through Faribault, and south of Austin into Iowa.

In Minnesota, the company that eventually became the Chicago, Milwaukee, St. Paul and Pacific Railroad was incorporated as the Minneapolis and Cedar Valley Railroad on March 1, 1856 (Luecke 1988). The purpose of the railroad was to connect Minneapolis/St. Paul with Milwaukee and Chicago via Prairie du Chien, Wisconsin. Construction began in 1858 in Minneapolis, and although construction was interrupted several times, the first passenger train ran between the Twin Cities and Faribault on December 23, 1865. By that time, the railroad was known as the Minnesota Central Railway (Luecke 1988:1-6). In 1868, the line was completed between Minneapolis and Chicago and was known as the Milwaukee and St. Paul Railway Company, or the "St. Paul" (Prosser 1966). The railroad may be significant as one of the first railroads to be built between Faribault and the Twin Cities.

Integrity considerations for railroad corridors are still being developed in Minnesota. However, the integrity considerations for other linear features, such as military roads and trails, can be applied to railroad segments in lieu of formalized criteria. For roads and trails, there are five integrity considerations:

1) route,
2) physical appearance,
3) sense of function or destination,
4) setting, and
5) other associational qualities, such as name or historical associations.

The railroad segment passing through Section 13 is probably part of the Minnesota Central Railway line that opened in December 1865. On all available historic county plat maps, the railroad is depicted on approximately the same alignment as it is now (Northwest Publishing Company 1900; W. W. Hixson and Company 1916; Webb Publishing Company 1915). The physical appearance of the segment most likely has not changed. There is still a noticeable railroad grade, and the rails and wooden ties are still intact. Because the line is still in use, there is a definite sense of function and destination. The setting is much as it might have been over a hundred years ago, with shrubs and trees separating farmland from the railroad right-of-way. Other historical associations have not been explored as part of this project. However, other properties associated with the Chicago, Milwaukee, St. Paul and Pacific railroad have been recorded in Minnesota, including the passenger depot in Northfield (RC-NFC-244).

Summary and Recommendations

No archaeological resources were identified within the MMPA project area, and there is little or no potential for intact archaeological remains because of plowing, erosion, and landscape setting.

The farmstead, Site RC-WLS-006, does not appear to retain sufficient integrity of design, setting, feeling, or association for listing on the National Register of Historic Places. No further work is recommended for this site.

Based on the information collected during this survey, we can reasonably assume that Site RC-WLS-007 is eligible for listing on the National Register of Historic Places. However, the MMPA project is not expected to have an adverse effect on the National Register-eligibility of the site. The 250-megawatt combined-cycle, gas-fired power plant will only occupy 20 acres of the 33-acre project area. Although the final design for the proposed plant has not been determined, the building will have a modern commercial or industrial appearance, possibly with natural lines and colors. The final design could be altered by a number of details, including bush and tree plantings, fences, paint colors, and lighting. The Federal Aviation Administration may also require a light or lights on the plant stack. However, lighting the stack would not create a new effect in the surrounding area, because the light will blend with the lights of an existing power plant to the east and an industrial/commercial area to the south. There will be no direct impacts to the railroad grade or the bordering vegetation. Indirect impacts include possible visual and audible impacts that are not expected to have adverse effect on the National Register-eligibility of the railroad segment. No further work is recommended for Site RC-WLS-007 unless the project is changed.

No additional cultural resources work is recommended for the MMPA Project area, provided the planned impacts to the site do not change.

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Architectural History Inventory
Long Form
Page 1

RC-WLS-OO6
Farmstead
17250 Acorn Trail, Wells Twp, Rice County, Minnesota

(Long forms are used for properties that meet minimum age and integrity considerations for full recordation)

General Information

Survey

Field I.D.	S1
Inventory Level	Phase I Inventory
Survey Date	July 23, 2002
Surveyor(s)	B. Mitchell

Survey Notes

Surveyor did not have permission to access the property. Inventory was conducted from public right-of-way and from the cropland that surrounds the farmyard.

Site Information

Buildings	House, barn, pump house, two sheds
Vegetation	Deciduous and coniferous trees
Land use	Property is a single-family residence. Resident does not own surrounding cropland.
Original Site?	Yes

Site Notes

The farmyard is approximately 1/8 mile off the road, and is bordered on the E and S by soybean crops and on the N and W by cornrows. The landscape rises gently toward the center and is dotted with deciduous trees.

Location

Quad Faribault

T 110N R 21W Sec. 13

N ½ SE ¼ NE ¼

UTM Z 15 E 477319 N 4909173

Photograph: Overall Site, from Acorn Trail

Roll 1 Frame 5 Date 07.23.02 Facing SW

(Long forms are used for properties that meet minimum age and integrity considerations for full recordation)

Description of Primary Building

Function

Original Function	Single-family residence
Current Function	Single-family residence

Form/Design

Style	Faint remnants of Queen Anne
Commercial Style	n/a
Plan Shape	Rectangle (originally "T")
# of Stories	1½
Structure	Wood Frame
Roof Shape	Cross-gable
Roof Details	Simple bargeboard in gable ends
Window Type(s)	Old and new: fixed, casement, 1-over-1 and 2-over-1 double-hung
Signage	n/a

Materials

Foundation	Concrete Block
Wall (primary)	Modern wood and composition board siding
Wall (secondary)	Horizontal wood siding (narrow exposure)
Roofing	Composition asphalt shingles

Note on Interior (if applicable)

Not accessible

Note on Architecture

History

Construction

Date	1890-1900
Owner	S.G. Benedict (1900)
Architect	Unknown

Alterations

Date	unknown
Owner	unknown

Note on Alterations

House is severely altered, including additions, in-fill of porches, and replacement of much of the original wall cladding, roofing materials, and windows.

Note on History

On the 1900, 1915, and 1916 plat maps, the residence is depicted in the NE ¼ of the NE ¼ of Section 13, rather than in the SE ¼ of the NE ¼. However, based on the relationship between the residence and the bend in Acorn Trail on the plat maps, we can assume that this is the same property. The plat maps indicate that the residence (along with the rest of the NE ¼ of the NE ¼) was owned by S. G. Benedict in 1900 and 1916, and Jacob J. Friesen in 1915. The plats also indicate that the property in the SE ¼ of the NE ¼ of Section 13 was owned by William Friesen in 1900, 1915, and 1916. William Friesen had lived in Rice County for about 20 years when the 1915 plat map was published and Jacob Friesen for about 12 years (Webb Publishing Company 1916). No significant historical associations were found for any of the men.

PHOTOGRAPH: House, from soybean field south of farmyard

Roll 1 Frame 15 Date 07.23.02 Facing NW

(Long forms are used for properties that meet minimum age and integrity considerations for full recordation)

CONDITION/INTEGRITY

Design Integrity	Poor to fair
Material Integrity	Poor
Site Integrity	Poor to fair
Window Integrity	Most original windows replaced/ openings intact

Note on Integrity

The two primary buildings, the house and barn, no longer retain integrity of design, material, or workmanship. One of the sheds has significant alterations and the other appears to be barely 50 years old. Based on a comparison with a 1991 aerial photograph, the farmstead has lost at least one primary structure. The farmstead is no longer associated with the surrounding cropland, which is under separate ownership. Neither the individual buildings nor the farmstead as a whole retain sufficient integrity of design, setting, materials, workmanship, feeling, or association for listing on the National Register of Historic Places

SIGNIFICANCE

Level of Significance	Local
State Context	Railroads and Agricultural Settlement, 1870-1940
NR Eligibility	Not Eligible
NR Criteria	n/a

Note on Significance

Although the farmstead appears to date to the 1890s, most of the buildings have been altered and the farmstead as a whole is no longer intact. None of the individual buildings is a significant example of its property type and none is likely to be found eligible for individual listing on the National Register of Historic Places. No significant historical associations were found.

REFERENCES

North West Publishing Company
1900 *Plat Book of Rice County, Minnesota: Compiled from County Records and Actual Surveys*. Northwest Publishing Company, Philadelphia.

W. W. Hixson and Company
1916 *Plat Book of Minnesota*. W. W. Hixson, Rockford, Illinois.

Webb Publishing Company
1915 *Atlas and farm directory with complete survey in township plats, Rice County, Minnesota*. Webb Publishing Company, St. Paul.

(Long forms are used for properties that meet minimum age and integrity considerations for full recordation)

PHOTOGRAPH: Barn and outbuildings, from southwest corner of property

Roll 1 Frame 11 Date 07.23.02 Facing NE

PHOTOGRAPH: Outbuildings, from northwest corner of property

Roll 1 Frame 7 Date 07.23.02 Facing SE

Architectural History Inventory

Long Form
Page 1

RC-WLS-007
Chicago, Milwaukee, St. Paul and Pacific Railroad Segment
Wells Twp, Rice County, Minnesota

(Long forms are used for properties that meet minimum age and integrity considerations for full recordation)

General Information

Survey

Field I.D. S2

Inventory Level Phase I

Survey Date 07/23/2002

Surveyor(s) B. Mitchell

Survey Notes

Only the portion of the railroad segment that is located in the SE ¼ of the NE ¼ of Section 13 was investigated as part of this project.

Site Notes

The railroad is actively being used. Acorn Trail is a north-south road that parallels the railroad to the east in the SE ¼ of the NE ¼ of Section 13, crosses the tracks at approximately the quarter-section line, and then parallels the railroad to the west in the NE ¼ of the NE ¼ of Section 13. The railroad is bordered on either side by shrubs, trees, and tall grasses.

Location

Quad Faribault (1960)

T 110N R 21W Sec. 13

E ½ E ½

(N) UTM Z 15 E 477464 N 4909626

(S) UTM Z 15 E 477337 N 4907987

PHOTOGRAPH: Chicago, Milwaukee, St. Paul and Pacific Railroad, from Acorn Trail.

Roll 1 Frame 1 Date 07.23.02 Facing South

History

In Minnesota, the company that eventually became the Chicago, Milwaukee, St. Paul and Pacific Railroad was incorporated as the Minneapolis and Cedar Valley Railroad on March 1, 1856 (Luecke 1988). The purpose of the railroad was to connect Minneapolis/St. Paul with Milwaukee and Chicago via Prairie du Chien, Wisconsin. Construction began in 1858 in Minneapolis, and although construction was interrupted several times, the first passenger train ran between the Twin Cities and Faribault on December 23, 1865. By that time, the railroad was known as the Minnesota Central Railway (Luecke 1988:1-6). In 1868, the line was completed between Minneapolis and Chicago and was known as the Milwaukee and St. Paul Railway Company, or the "St. Paul" (Prosser 1966).

Condition/Integrity

The railroad segment passing through Section 13 is part of the Minnesota Central Railway line that opened in December 1865. On all available historic county plat maps, the railroad is depicted on approximately the same alignment as it is now (Northwest Publishing Company 1900; W. W. Hixson and Company 1916; Webb Publishing Company 1915). The physical appearance of the segment most likely has not changed. There is still a noticeable railroad grade, and the rails and wooden ties are still intact. Because the line is still in use, there is a definite sense of function and destination. The setting is much as it might have been over a hundred years ago, with shrubs and trees separating farmland from the railroad right-of-way. Other historical associations have not been explored as part of this project. However, other properties associated with the Chicago, Milwaukee, St. Paul and Pacific railroad have been recorded in Minnesota, including the passenger depot in Northfield (RC-NFC-244).

Significance

Level of Significance	Local, State
State Context	Railroads and Agricultural Settlement, 1870 - 1940
NR Eligibility	May be eligible
NR Criteria	Criterion A

The railroad may be significant as one of the first railroads to be built between Faribault and the Twin Cities.

References

Luecke, J. C.
1988 *Dreams, Disasters, and Demise: The Milwaukee Road in Minnesota*. Grenadier Publications, Eagan, Minnesota.

North West Publishing Company
1900 *Plat Book of Rice County, Minnesota: Compiled from County Records and Actual Surveys*. Northwest Publishing Company, Philadelphia.

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W. W. Hixson and Company
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Webb Publishing Company
1915 *Atlas and farm directory with complete survey in township plats, Rice County, Minnesota*. Webb Publishing Company, St. Paul.

Appendix C

Wetland Screening Report

Wetland Delineation

MMPA Power Generation Facility
Faribault, Minnesota

Minnesota Municipal Power Agency

October 2002

Stanley Consultants INC.

A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

Table of Contents

TABLES

FIGURES

APPENDICES

Section 1

Introduction

Background

Stanley Consultants, Inc. was retained by Minnesota Municipal Power Agency to conduct a wetland delineation on an approximately 37-acre site of a future power generating facility. The project site (see Figure 1-1) is located just north of Faribault, Minnesota, in Rice County.

Minnesota Municipal Power Agency is interested in delineating wetlands that may be disturbed or impacted by the future project so proper permitting and mitigation may be accomplished. Stanley Consultants' personnel visited the site on July 26 and 23 and September 13 and 26, 2002, and performed a wetlands evaluation in accordance with the United States Army Corps of Engineers (USACE) Wetlands Delineation manual (1987), and performed research as directed by that guidance. The results of this evaluation are contained within this report.

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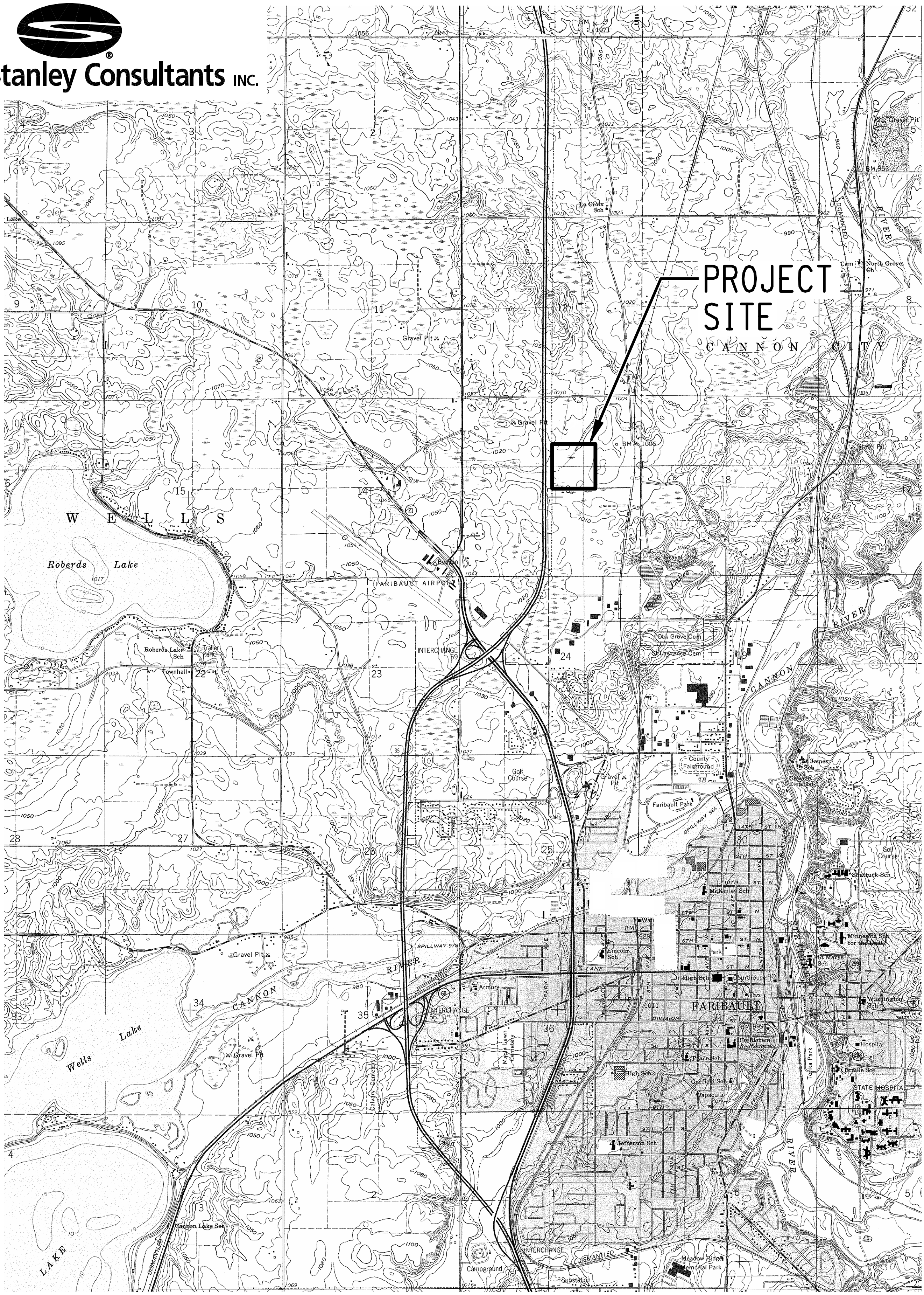

Vicinity Map
Figure 1–1

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Section 2

Regulatory and Technical Background

General

Recognizing the potential for continued or accelerated degradation of the Nation's waters, the US Congress enacted the Clean Water Act (hereafter referred to as the Act), formerly known as the Federal Water Pollution Control Act (33 U.S.C. 1344). The objective of the Act is to maintain and restore the chemical, physical, and biological integrity of the waters of the United States. Section 404 of the Act authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into the waters of the United States, including wetlands.

The following definition, diagnostic environmental characteristics, and technical approach comprise a guideline for the identification and delineation of wetlands:

The USACE (Federal Register, 1982) and the Environmental Protection Agency (Federal Register, 1980) jointly define wetlands as: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands Diagnostic Environmental Characteristics

Wetlands have the following general diagnostic environmental characteristics:

- Vegetation. The prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions described in wetlands. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptations, have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions. Some species (e.g. Acer rubrum) having broad ecological tolerances occur in both wetlands and non-wetlands.

- Soil. Soils are present and have been classified as hydric or they possess characteristics that are associated with reducing soil conditions.
- Hydrology. The area is inundated either permanently or periodically at mean water depths <6.6 feet or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation. The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and non-tidal situations.

Except in certain situations defined in the USACE manual, evidence of a minimum of one positive wetland indicator from each parameter (vegetation, hydrology, and soil) must be found in order to make a positive wetland determination.

Non-wetlands Diagnostic Environmental Characteristics

The following definition, diagnostic environmental characteristics and technical approach comprise a guideline for the identification and delineation of non-wetlands: Non-wetlands include upland and lowland areas that are neither deepwater aquatic habitats, wetlands, nor other special aquatic sites. They are seldom or never inundated, or if frequently inundated, they have saturated soils for only brief periods during the growing season, if vegetated, and, they normally support a prevalence of vegetation typically adapted for life only in aerobic soil conditions.

Non-wetlands have the following general diagnostic environmental characteristics:

- Vegetation. The prevalent vegetation consists of plant species that are typically adapted for life only in aerobic soils. These mesophytic and/or xerophytic macrophytes cannot persist in predominantly anaerobic soil conditions. Some species, due to their broad ecological tolerances, occur in both wetlands and non-wetlands (e.g. Acer rubrum).
- Soil. Soils, when present, are not classified as hydric, and possess characteristics associated with aerobic conditions.
- Hydrology. Although the soil may be inundated or saturated by surface water or ground water periodically during the growing season of the prevalent vegetation, the average annual duration of inundation or soil saturation does not preclude the occurrence of plant species typically adapted for life in aerobic soil conditions.

When any one of the diagnostic characteristics identified above is present, the area is a non-wetland.

Prior Converted Cropland

Prior converted croplands (PC) are wetlands that were drained, dredged, filled, leveled, or otherwise manipulated, including the removal of woody vegetation, before December 23, 1985, to make production of an agricultural commodity possible, and that:

- Do not meet specific hydrologic criteria.
- Have had an agricultural commodity planted or produced at least once prior to December 23, 1985.
- Have not since been abandoned.

Activities in prior converted cropland are not regulated under Section 404. If prior converted cropland is not planted to an agricultural commodity for more than five consecutive years and wetland characteristics return, the cropland is considered abandoned and then becomes a wetland subject to regulation under Section 404.

Prior converted croplands generally have been subject to such extensive and relatively permanent physical hydrological modifications and alteration of hydrophytic vegetation that the resultant cropland constitutes the "normal circumstances" for purposes of Section 404 jurisdiction. Consequently, the "normal circumstances" of prior converted croplands generally do not support a "prevalence of hydrophytic vegetation" and as such are not subject to regulation under Section 404. In addition, our experience and professional judgment lead us to conclude that because of the magnitude of hydrological alterations that have most often occurred on prior converted cropland, such cropland meets, minimally if at all, the Manual's hydrology criteria.

Section 3

Site Information

Site Description

The parcel of land on which the future project will be located is in the southwest ¼ of the northeast ¼ of Section 13, Township 110N, Range 21W in Rice County, Minnesota. A vicinity map showing the location of the site is presented in Figure 1-1. Approximately 37 acres of land is included within the scope of the delineation as shown on Figure 3-1.

Except where drainageways are present, the entire parcel was actively farmed in 2002 with row crops (corn and soy beans). Crops have been planted generally from fence row to fence row.

Area Hydrology

The site is relatively flat with a deep drainageway that enters the site from the west at the outlet end of an 84”x60” CMP culvert pipe under I-35, passes through the site, and exits the site in the northeast corner. This drainageway is tributary to the Cannon River. Other minor drainageways are present and flow into the main drainageway. They include one along a portion of the south and west property lines and another in the northwest portion of the site. A low rise aligned north and south is present along the eastern side of the site with a slight down grade to the west towards the deep drainageway that flows northeasterly through the site. Land adjacent to the southern edge of the property is lower with depressional areas observed. It appears some surface runoff occurs from the adjacent property into the drainageway along the south property line.

The main drainageway appears to have at least semi-permanent water in it since minnows and frogs were observed. The drainageway through the site is uniform in shape with a bottom width of about 9 feet and a top width of about 24 to 26 feet. It is approximately 5 feet deep near the west property line and 4 feet deep near the north property line. A 20-foot long 5-foot diameter riveted steel culvert provides a drainageway crossing for farm equipment at the north property line. The appearance of the drainageway combined with inspection of historical aerial photographs indicates that the drainageway was channelized sometime in the past.

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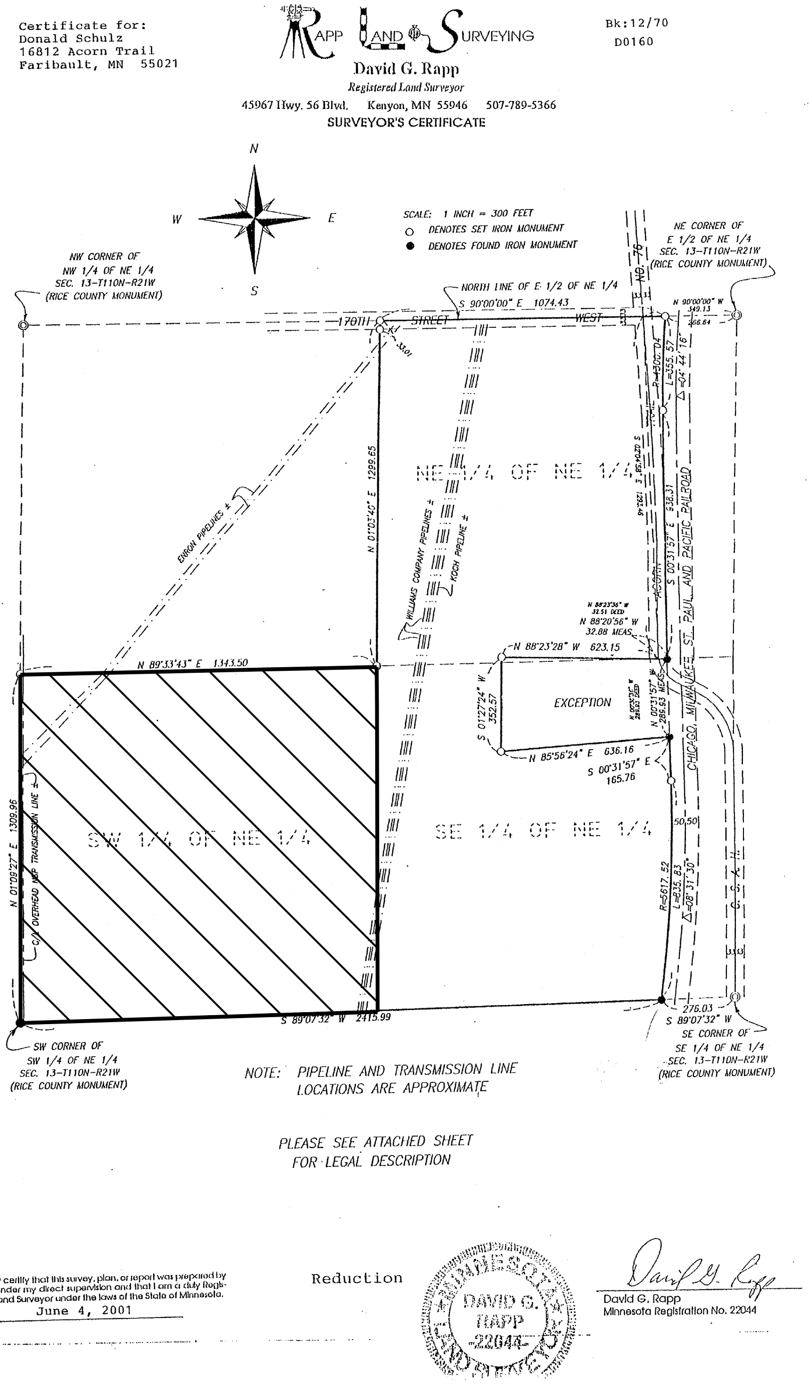

Subject Property
Figure 3–1

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CADD A2-R4 © STANLEY CONSULTANTS

According to the landowner some of the ground is tiled. One specific tile location was identified.

Soils

Figure 3-2 shows soil classifications for the subject property. Soil types found on the site are presented on Table 3-1. Hydric soils, including Cordova clay loam (Map Symbol 109), Glencoe clay loam (Map Symbol 114) and Hamel loam (Map Symbol 414), are located on the property and occupy the low areas and depressions.

Table 3-1 Soils on Subject Property

Map Symbol	Soil Name	Slope Percent	Comment	Hydric
104B	Hayden Loam	2-6	Well drained	No
104C2	Hayden Loam	6-12	Well drained	No
109	Cordova Clay Loam	0-2	Poorly drained	Yes
114	Glencoe Clay Loam	0-1	Very poorly drained	Yes
414	Hamel Loam	1-3	Poorly drained	Yes
1361	LeSueur Loam	1-3	Moderately well drained	No

Source: Soil Survey of Rice County, Minnesota, U.S. Department of Agriculture, Natural Resources Conservation Service, 2000 and Rice County Update, Minnesota, Comprehensive Hydric Soils List, U.S. Department of Agriculture, Natural Resources Conservation Service, 2000

National Wetlands Inventory (NWI) Map

The National Wetlands Inventory (NWI) Map, prepared by the U.S. Fish and Wildlife Services (FWS) is presented on Figure 3-3 for the subject property. The NWI map does not recognize any identified wetlands.

The NWI map was developed on 1960 USGS topographic base mapping. The I-35 corridor, which establishes the western boundary of the site, does not appear on this map. A Palustrine emergent, seasonal partially drained/ditched (PEMCd) wetland is located in the vicinity of the I-35 corridor. The location of this wetland may be coincident with Wetland A that was delineated as part of this work and described later in this report.

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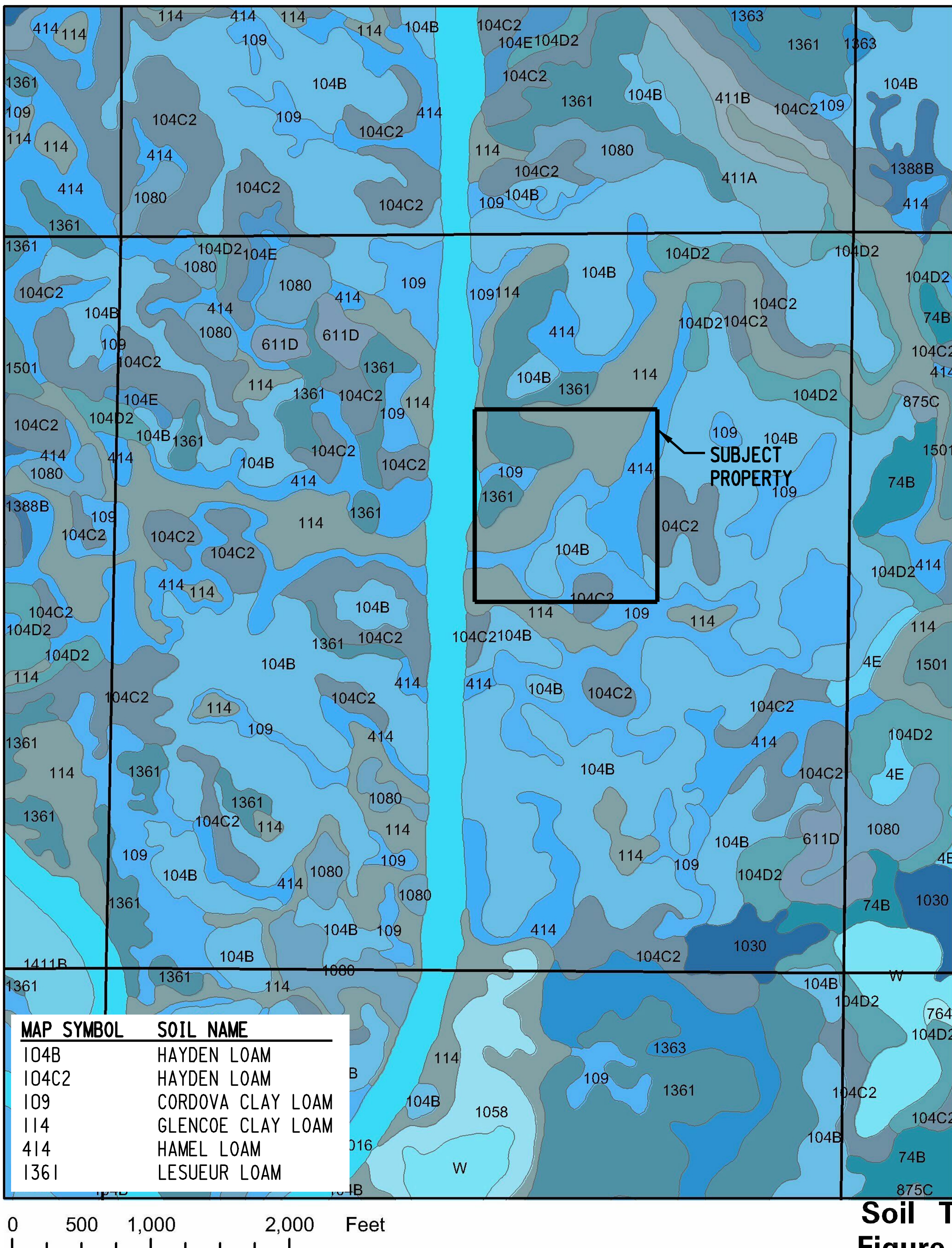
Soil Survey Map Units
T110N, R21N, Section 13
Rice County, Minnesota



Soil Types
Figure 3-2

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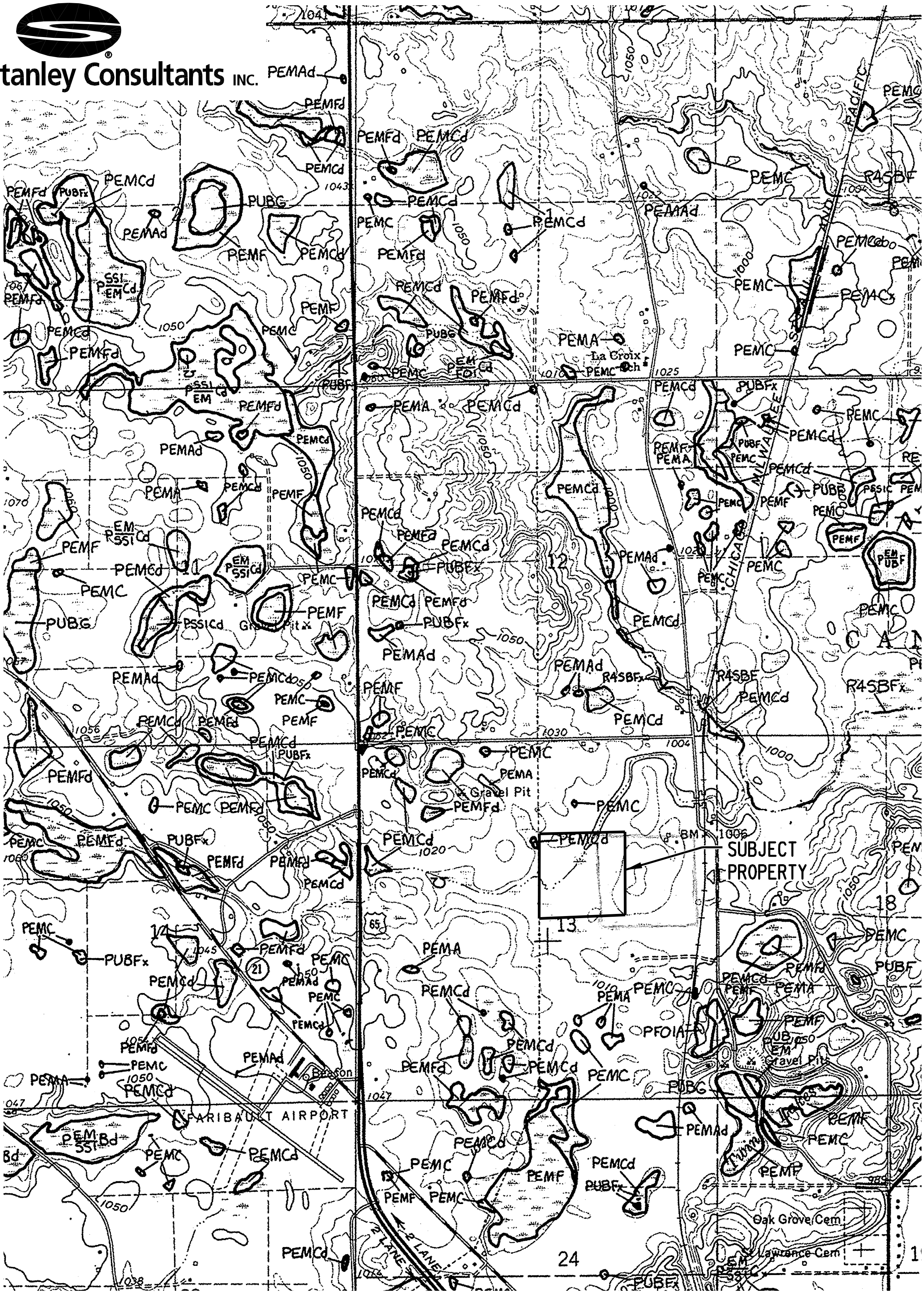

National Wetlands Inventory Map
Figure 3–3

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CADD A2-R4 © STANLEY CONSULTANTS

Section 4

Wetlands Delineation

Wetlands Delineation

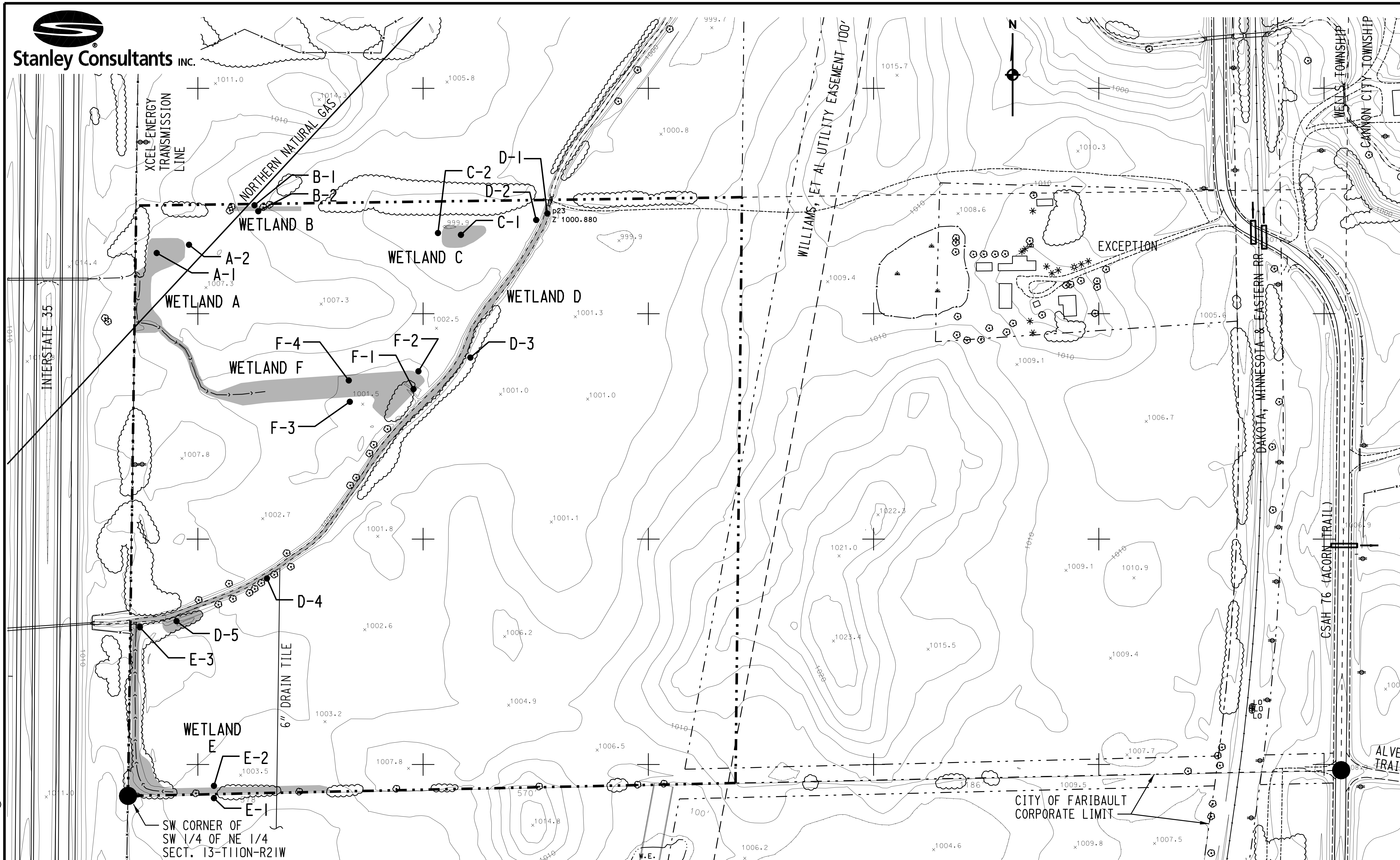
Several wetland areas were found within the subject property. Three areas are associated with small depressions in hydric soil. Three wetland areas are associated with the drainageways that are described in Section 3. Delineated wetland locations are shown on Figure 4-1. The field data sheets are provided in Exhibit A. Representative photographs of the wetland areas are presented in Exhibit B.

Wetland No. A

Wetland No. A (see Figure 4-1) is located in a depression in the northwest corner of the site. The western end of the depression is partially defined by the I-35 right-of-way fence line and vegetation. However, the southwestern portion of the basin extends south into a shallow swale and west into the I-35 right-of-way. The portion of the wetland within the project boundaries is approximately 5600 square feet (0.13 acres).

The wetland is located in a cultivated field planted in corn. No corn is present in the depression, but corn surrounds the depression on three sides. A 10-foot wide ring of cocklebur (Xanthium strumarium) with some smartweed (Polygonum amphibium) and pigweed (Amaranthus sp.) is located inside the corn with the plant species transitioning to a stand of immature unknown grass in the center of the depression.

The soil found in the depression matches the Glencoe clay loam mapping unit. The soil at Data Point A-1 exhibits low chroma color, which indicates the presence of hydric soils. Glencoe clay loam is also listed as a hydric soil in the Rice County hydric soil list. Soil on higher ground outside the perimeter of the depression changes to LeSueur loam mapping series. The soil at Data Point A-2 located where the corn begins is a dry sandy silt with cobbles in the upper four inches. The soil was too hard to penetrate deeper.



Delineated Wetland Locations
Figure 4-1

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CADD B2-R4
© STANLEY CONSULTANTS

Using the Classification of Wetlands and Deep Water Habitats of the United States, this farmed wetland comprises approximately 11,400 square feet (0.26) acres) and can be classified by the Cowardin system as a palustrine wetland with emergent vegetation subject to temporary inundation (PEMA). This corresponds to a Type 1 wetland based on the U.S. Fish and Wildlife Service (USFWS) Circular 39 classification system.

Wetland No. B

Wetland No. B (see Figure 4-1) is located in a depressional area at the bottom of the north and south facing slopes that straddles the north property line. The depression is not currently cultivated and does not show evidence of cultivation, at least in recent years. Only a small portion of the wetland extends into the subject property; as most of it is located on the adjoining property to the north. The area of the wetland south of the property line within the subject property is approximately 1500 square feet (0.03 acres).

The vegetation in this wetland is more diverse and established than at any of the other wetland locations. Since it is not cultivated, several species can be found including Reed canary grass (Phalaris arundinacea), fall panicum (Panicum dichotomiflorum), slender rush (Juncus tenuis) and several other species scattered throughout the wetland. The vegetation changes abruptly along the southern edge of the wetland as a healthy stand of corn is present where cultivation begins. A narrow band of predominantly great ragweed (Ambrosia trifida) separates the diverse wetland vegetation from the corn.

Soil in the depression matches the Glencoe clay loam mapping series. This series is listed on the hydric soils list. Soils at Data Point B-1 exhibit low chroma colors further indicating hydric conditions. Soil at Data Point B-2 is dry sandy silt with cobbles as the soil transitions to mapping series LeSueur loam.

The wetland within the subject property can be classified as PEMA by the Cowardin system and Type 1 by the USFWS Circular 39 system.

Wetland No. C

Wetland No. C (see Figure 4-1) is a depression located in a cornfield along the northern edge of the subject property. It has similar characteristics as Wetland No. A. Vegetation in the depression is a monoculture of pigweed (Amaranthus sp.). Corn surrounds the depression. According to the landowner, this depression has not been tiled. According to the soils map Glencoe clay loam is found both in the depression and outside of the depression. Soil samples taken at Data Points C-1 and C-2 match the characteristics of the Glencoe mapping series. The wetland area is approximately 3900 square feet (0.09 acres). The area is a farmed wetland and can be classified as a PEMA by the Cowardin system and Type 1 by the USFWA Circular 39.

Wetland No. D

Wetland No. D (see Figure 4-1) comprises a deep drainageway that runs northeasterly across the site. The drainageway appears to have been channelized sometime in the past since it is straight with a uniform cross section. The bottom width is approximately 9 feet and the top width is approximately 24 to 26 feet. The channel ranges from 4 to 5 feet deep. A 20-foot long, 5-foot diameter riveted steel culvert is located in the drainageway at the north property line providing a farm equipment access across the drainageway. There appears to be permanent to semi-permanent water in the drainageway since minnows and frogs were observed. At the time of the field survey water was flowing to the northeast.

Data Point D-1 shows wetland vegetation and hydrology. The soils appear to be depositional and exhibit an aquic moisture regime. Data Point D-2 taken at the top of the west bank shows that even though wetland vegetation and hydric soil are present, sufficient hydrology indicators are not present to call the area on the top of the bank a wetland. This is supported by similar observations from Data Point D-3 taken at the top of the east bank. Therefore, only the drainageway channel and sideslopes are considered wetland at these locations covering an area of approximately 14,800 square feet (0.34 acres).

At Data Point D4, taken at the top of the east bank, a dense stand of sandbar willow (Salix exigua) is located. The soils at this location are heavy silty clay (10YR3/1) from 0 to 8 inches and clay silt (10YR3/1) at a depth greater than 8 inches. This area tends to be slightly lower than the surrounding area so water may collect here longer than other areas along the bank. The area generally defined by the limit of the stand of sandbar willow exhibits wetland characteristics and is included as part of the area calculation for Wetland D. It can be classified as palustrine emergent seasonal and ditched (PEMCd) by the Cowardin system and Type 3 by the USFWS Circular 39 system.

Wetland No. E

Wetland No. E (see Figure 4-1) comprises a shallow manmade drainageway that runs west, then north, along the south and west property lines. Data Point E1 shows that heavy moist silty clay soil is present in the channel. In the upper 20 inches it is dark (10YR2/1) but changes rapidly to a gray (10YR5/1) with oxidized root channels. Hydrophytic vegetation is located in the drainageway as well. At Data Point 2 the soil has transitioned to a drier, but dark, clay silt (10YR2/1) to 16 inches. This data point is on slightly higher ground and vegetation has begun to transition to more upland type species. Water entering the drainageway comes from runoff from the soybean field on the adjoining property to the south with some additional runoff from the soybean field on the subject property. The extent of the wetland at this location is the drainageway with the boundary defined by a change in ground elevation on either side of the channel.

Wetland E continues along the south and west property lines and discharges into the main drainageway at the west property line. At its confluence with the main drainageway, the channel outlet is approximately 2 feet above the bottom of the main drainageway.

The wetland can be classified as PEMAd by the Cowardin system and Type 1 by the USFWS Circular 39 system. The total area of Wetland E is approximately 16,000 square feet (0.37 acres).

Wetland No. F

Wetland No. F (see Figure 4-1) comprises a shallow drainageway that drains Wetland No. A. Its upstream end is narrow (approximately 15 feet) but widens to approximately 50 feet in the downstream reach. Prior to discharge into the main drainageway, a broad flat area collects water before it is slowly released. A rock letdown structure directs water from the wetland area to the main drainageway. The location of the drainageway wetland is within a cornfield. The drainageway may have been planted with corn, but no corn to very scattered and stunted corn exists. At Data Point F the healthy stand of corn on slightly higher ground transitions quickly to cocklebur (Xanthium strumaium), and pigweed (Amaranthus sp.) with River Bulrush (Scirpus fluviatilis) and Smartweed (Polygonum amphibrum) towards the lowest portion of the swale. The soil changes little when samples taken in the corn and the transition area are compared. Samples taken at Data Points F1 and F2 exhibit hydric characteristics with a dark silty clay (10YR2/1) overlaying a gray silty clay (10YR4/1). At Data Point Nos. F-3 and F-4 similar soil characteristics were found but a silty sand layer is present unlying the silty clays at about 20-22 inches in depth. The wetland boundary was located primarily based on change in vegetation and relief along the edge of the drainageway.

The wetland can be classified as PEMAd by the Cowardin system and Type 1 by the USFWS Circular 39 system. The total area for this drainageway wetland (Wetland F) is approximately 27,500 square feet (0.63 acres).

Section 5

Conclusion

Delineated Wetlands

Six wetland areas were identified and delineated on the site of the future power generating facility. Three of the wetlands are depressions and three are drainageways. The total area for the three depressional wetlands is approximately 0.25 acres. Approximately 1.34 acres is included in the drainageway wetlands.

Development activities affecting these wetlands will require approval from the U.S. Army Corps of Engineers, Natural Resources Conservation Service, Minnesota Department of Natural Resources and/or the Minnesota Board of Water and Soil Resources. In addition, other state and local regulatory agencies may need to approve the proposed development activities.

Wetland Regulation

In most cases altering a wetland typically by draining or filling will require a permit or some type of authorization. In Minnesota, a number of agencies could have jurisdiction over a wetland depending on the circumstances associated with the wetland and proposed project. Agency involvement can occur on a federal, state, or local level and could include the U.S. Army Corps of Engineers, U.S. Department of Agriculture Natural Resources Conservation Service, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, and the Rice Soil and Water Conservation District.

The Minnesota Wetland Conservation Act specifies ten categories of exempt drain or fill activities where no permit or approval is necessary. Among the exempt status certain agricultural activities are included that impact Type 1 and Type 2 wetlands. Activities in these wetlands include those that were planted with annually seeded crops or were in a crop rotation seeding of pasture grass or legumes in six of the last ten years prior to January 1, 1991.

The Rice Soil and Water Conservation District needs to be contacted for a formal determination on whether a wetland is eligible for regulation or exempt. This process is initiated by filling out a "Minnesota Local/State/Federal Application Form for Water/Wetland Projects." This form will be sent to all wetland regulatory agencies asking if they have jurisdiction over any wetlands in the project area.

Section 6

References

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12. Munsell Soil Color Charts, Gretag McBeth, New Windsor, New York, 2000.

Respectfully submitted,

Stanley Consultants, Inc.

Prepared by ______________________________

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Principal Environmental Engineer

Reviewed by ______________________________

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Approved by ______________________________

Martin J. Weber, P.E.
Project Manager

I hereby certify that this plan, specification, or report was prepared by me or under my direct personal supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature: ____________________ Typed or Printed Name: Martin J. Weber, P.E.

Date: October 15, 2002 Reg. No.: 20419

ERS:dll:16245rpt

Appendix A

Data Forms

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	9/26/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	D-3
(If needed, explain on reverse.)				

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Soy Beans		H	---	9.	Ribes missouriense		S	?
2.	Salix exigua		S	OBL	10.	Anemone quinguefolia		H	FAC*
3.	Phalaris arundinacea		H	FACW+	11.				
4.	Rubis strigosus		S	FACW-	12.				
5.	Ambrosia trifida		H	FAC+	13.				
6.	Parthenocissus quinguefolia		WV	FAC-	14.				
7.	Acer negundo		T	FACW-	15.				
8.	Vitis riparia		WV	FACW-	16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: The species presented above cover an area on the drainageway bank on both sides of the data point from the edge of the cultivated field to the edge of the bank. Species are presented generally in order of occurrence from the soybean field to the drainageway.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ____________ (in.)

Depth to Free Water in Pit: ____________ (in.)

Depth to Saturated Soil: ____________ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches (1)
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: No hydrology indicators present.

(1) Roots but no oxidized channels.

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ (1) No ☐ (1) >/ 20"

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-20		10YR3/1			Dry silty clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: It is likely that the soil, especially the top 20", is overburden from excavation of the drainageway.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☐	No ☒
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☐ No ☒

Type:

- Cowardin:
- USFWS Circular 39:

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	9/26/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	D-4

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Salix exigua	90±	T	OBL	9.	Viburnum lentago	<5	S	FAC+
2.	Populus deltoids	<5	T	FAC+	10.				
3.	Vitis riparia	<5	WV	FACW-	11.				
4.	Urtica dioca	<5	H	FAC+	12.				
5.	Sambucus Canadensis	<5	S	FACW-	13.				
6.	Parthenocissus vitacea	<5	H	FAC-	14.				
7.	Rhamnus catharica	<5	S	FACU*	15.				
8.	Fraxinum pennsylvanica	<5	T	FACW	16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: * "Wetland Plants and Plant Communities or Minnesota & Wisconsin"; Egger, S.D. & Reed, D.M. 1997 lists Rhamnus cathartica as FAC-.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: ______ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches (1)
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: Area where sandbar willow (Salix exigua) occurs is slightly lower than adjoining field and other areas of bank allowing water to collect here more than elsewhere along bank.

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ (1) No ☐ (1) >/ 20”

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-8		10YR3/1			Silty clay
8”+		10YR3/1			Clay silt

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Soil is heavy and contains more moisture than at Data Point D-3.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☒ No ☐

Type:

- Cowardin: PEMCd
- USFWS Circular 39: Type 3

Remarks: This wetland part of the drainageway system.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	9/13/02, 9/26/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☐	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☐	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☐	Plot ID:	E-1
(If needed, explain on reverse.)				

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Phalaris arundinacea	95+	H	FACW+	9.				
2.	Vitis riparia	<5	WV	FACW-	10.				
3.	Acer negundo	<5	T	FACW-	11.				
4.	Scirpus fluviatilis	<5	H	OBL	12.				
5.					13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ____________ (in.)

Depth to Free Water in Pit: ____________ (in.)

Depth to Saturated Soil: ____________ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☒ Oxidized Root Channels ~~in Upper 12 inches~~ (1)
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: (1) Below 20".

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-20		10YR2/1			Moist silty clay
20+		10YR5/1	7.5 YR 4/6		Silty clay

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☒ No ☐

Type:

- Cowardin: PEMAd
- USFWS Circular 39: Type 1

Remarks: The depression can be considered a farmed wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	9/13/02, 9/26/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	E-2

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Cirsium arvense	5	H		9.				
2.	Urtica dioica	5	H		10.				
3.	Rose multiflora	<5	S	FACU	11.				
4.	Phalaris arundinacea	25	H	FACW+	12.				
5.	Vitis riparia	<5	WV	FACW-	13.				
6.	Solidago gigantean	10	H	FACW	14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ____________ (in.)

Depth to Free Water in Pit: ____________ (in.)

Depth to Saturated Soil: ____________ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: Data point located on higher ground than drainageway and Data Point No. E-2 and soil is much drier.

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-16		10YR2/1			Clay silt

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☐	No ☐
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☐ No ☒

Type:

- Cowardin:
- USFWS Circular 39:

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	9/16/02, 9/23602
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	F-1

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Corn (stunted)	5	H	---	9.				
2.	Xanthium strumarium	25	H	FAC	10.				
3.	Pigweed (Amaranthus sp.)	60	H	---	11.				
4.					12.				
5.	Salix exigua*		T	OBL	13.				
6.	Scirpus fluviatilis*		H	OBL	14.				
7.	Polygonum amphibium*		H	OBL	15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: *These species are located in the center of the drainageway away from Data Point No. F-1.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ____ (in.)

Depth to Free Water in Pit: ____ (in.)

Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks:

SOILS

Map Unit Name (Series and Phase):	Cordova clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-20		10YR2/1			Silty clay
20+		10YR4/1			Silty clay trace sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☒ No ☐

Type:

- Cowardin: PEMAd
- USFWS Circular 39: Type 1

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	9/13/02, 9/26/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	F-2

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Corn	100	H	Upland?	9.				
2.					10.				
3.					11.				
4.					12.				
5.					13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: Data point is in healthy stand of corn which transitions quickly to hydrophytic species towards the lower ground.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: ______ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: No hydrology indicators present.

SOILS

Map Unit Name (Series and Phase):	Hayden loam (Map Series 114)	Drainage Class:	Well drained
Taxonomy (Subgroup):	Typic hapludalfs	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-22		10YR2/1			Silty clay trace sand
22+		10YR4/1			Silty clay trace sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☐ No ☒

Type:

- Cowardin: ____________
- USFWS Circular 39: ____________

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	9/13/02, 9/26/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	F-3

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Corn (slightly stunted)	75	H	---	9.				
2.	Xanthium strumarium	25	H	FAC	10.				
3.					11.				
4.					12.				
5.					13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
  ☐ Stream, Lake, or Tide Gauge
  ☐ Aerial Photographs
  ☐ Other
☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: ______ (in.)

Wetland Hydrology Indicators:
Primary Indicators
  ☐ Inundated
  ☐ Saturated in Upper 12 inches
  ☐ Water Marks
  ☐ Drift Lines
  ☐ Sediment Deposits
  ☐ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
  ☐ Oxidized Root Channels in Upper 12 inches
  ☐ Water-Stained Leaves
  ☐ Local Soil Survey Data
  ☐ FAC-Neutral Test
  ☐ Other (Explain in Remarks

Remarks: Data point is located on slightly higher ground than drainageway.

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-19		10YR2/1			Silty clay
18-20+		10YR6/2			Silty sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? *	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☐ No ☒

Type:

- Cowardin:
- USFWS Circular 39:

Remarks: *Corn.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	9/13/02, 9/26/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	F-4
(If needed, explain on reverse.)				

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Xanthium strumarium	50	H	FAC	9.				
2.	Scirpus fluviatilis	<5	H	OBL	10.				
3.	Ambrosia artemisiifolia	20	H		11.				
4.	Ambrosia trifida	<5	H	FAC+	12.				
5.	Populics deltoids	5	H	FAC+	13.				
6.	Corn (stunted)	<5	H	---	14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ________ (in.)

Depth to Free Water in Pit: ________ (in.)

Depth to Saturated Soil: ________ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks:

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-9		10YR2/1			Silty clay
9-10		10YR4/1			Sandy silty clay
10-18+		10YR6/2			Silty sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☒ No ☐

Type:

- Cowardin: PEMAd
- USFWS Circular 39: Type 1

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	7/16/02, 7/23/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☐	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☐	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☐	Plot ID:	

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.					9.				
2.					10.				
3.					11.				
4.					12.				
5.					13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ____________ (in.)

Depth to Free Water in Pit: ____________ (in.)

Depth to Saturated Soil: ____________ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain i n Remarks

Remarks:

SOILS

Map Unit Name (Series and Phase):		Drainage Class:	
Taxonomy (Subgroup):		Field Observations Confirm Mapped Type?	Yes ☐ No ☐

<u>Profile Description</u>:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☐	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☐	
Hydric Soils Present?	Yes ☐	No ☐	Is this Sampling Point Within a Wetland? Yes ☐ No ☐

<u>Type</u>:

- Cowardin:
- USFWS Circular 39:

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	7/16/02, 7/23/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	A-1

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Pigweed (Amaranthus sp.)		H	---	9.				
2.	Xanthium strumarium		H	FAC	10.				
3.	Unknown grass		H	---	11.				
4.	Phalaris arundinacea		H	FACW+	12.				
5.	Polygonum amphibium		H	OBL	13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: Depression was planted with corn but no corn present. Corn present around perimeter of depression on south, east and north. Stunted weeds and unknown immature grass are present in depression. A ring of cocklebur (Xanthium strumarium) approximately 10 feet wide is present inside corn with some scattered pigweed (Amaranthus sp.) and smartweed (Polygonum amphibium) present. Depression extends across I-35 fence line. Vegetation in fence line dominated by Reed canary grass (Phalaris arundinacea).

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ____________ (in.)

Depth to Free Water in Pit: ____________ (in.)

Depth to Saturated Soil: ____________ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☒ Other (Explain in Remarks

Remarks: Stunted plant growth in depression and no corn present. Landowner did not indicate the presence of field tile.

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-18		10YR2/1			Loam
18-33		10YR2/1			Loam trace sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☐	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☒ No ☐

Type:

- Cowardin: PEMA
- USFWS Circular 39: Type 1

Remarks: The depression can be considered a farmed wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	7/16/02, 7/23/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	A-2

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Corn (Zea mays)	100	H	Upland?	9.				
2.					10.				
3.					11.				
4.					12.				
5.					13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: Corn shows no sign of stress.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: ______ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: Very dry soil on slightly higher ground than Data Point A-1. No hydrology indicators present.

SOILS

Map Unit Name (Series and Phase):	LeSueur loam (Map Series 1361)	Drainage Class:	Moderately well drained
Taxonomy (Subgroup):	Aquic Arqiudolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-4		10YR3/2			Sandy silt w/cobbles

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Soil is very dry. Could not penetrate probe any deeper.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒
Hydric Soils Present?	Yes ☐	No ☒

Is this Sampling Point Within a Wetland? Yes ☐ No ☒

Type:

- Cowardin:
- USFWS Circular 39:

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	7/16/02, 7/23/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☒	No ☐	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☐	No ☒	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	B-1

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Carex molesta	<5	H	NL (1)	9.				
2.	Phalaris arundinacea	10	H	FACW+	10.				
3.	Agrostis gigantea	5	H	FACW	11.				
4.	Juncus tenuis	40	H	FAC	12.				
5.	Panicum dichotomiflorum	10	H	FACW-	13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: (1) Not Listed in National List of Plant Species That Occur in Wetlands; North Central (Region 3) U.S. Department of the Interior Biological Report 88(26.3) May 1988.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: ______ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☒ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: Area located at bottom of two rises – one to north and one to south. Runoff from these two hills tends to collect in area.

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-18		10YR2/1			Loam w/organic
18-33		10YR2/1			Loam

Hydric Soil Indicators:

☐	Histosol	☐	Concretions
☐	Histic Epipedon	☐	High Organic content in Surface Layer in Sandy Soils
☐	Sulfidic Odor	☐	Organic Streaking in Sandy Soils
☐	Aquic Moisture Regime	☒	Listed on Local Hydric Soils List
☐	Reducing Conditions	☐	Listed on National Hydric Soils List
☒	Gleyed or Low-Chroma Colors	☐	Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		
Hydric Soils Present?	Yes ☒	No ☐	Is this Sampling Point Within a Wetland?	Yes ☒ No ☐

Type:

- Cowardin: PEMA
- USFWS Circular 39: Type 1

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	7/16/02, 7/23/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	B-2

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Corn (Zea mays)	100	H	Upland?	9.				
2.					10.				
3.					11.				
4.					12.				
5.					13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: Tall corn showing no signs of stress.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: ______ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: No wetland hydrology indicators.

SOILS

Map Unit Name (Series and Phase):	LeSueur loam (Map Series 1361)	Drainage Class:	Moderately well drained
Taxonomy (Subgroup):	Aquic Argiudolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-18		10YR3/2			Sandy silt w/cobbles

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒
Hydric Soils Present?	Yes ☐	No ☒

Is this Sampling Point Within a Wetland? Yes ☐ No ☒

Type:

- Cowardin:
- USFWS Circular 39:

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	7/16/02, 7/23/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	C-1

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Pigweed (Amaranthus sp.)	100	H		9.				
2.					10.				
3.					11.				
4.					12.				
5.					13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: Field planted in corn but plants stunted and missing in depression area. Instead, the depression is 100% vegetated in short weedy vegetation (pigweed). The species of pigweed could not be identified since it was just beginning to come into flower.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: ______ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☒ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: The soil surface was dry but evidence of earlier inundation includes deeply cracked, crusty caked surface.

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-27		10YR2/1			Loam
27-33+		10YR6/1			Clay silt

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☒	No ☐
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☒ No ☐

Type:

- Cowardin: PEMA
- USFWS Circular 39: Type 1

Remarks: The depression can be considered a farmed wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	7/16/02, 7/23/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	C-2

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Corn (Zea mays)	100	H		9.				
2.					10.				
3.					11.				
4.					12.				
5.					13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: Cultivated field planted in corn. Data point in transition area from stunted and missing corn in depression to healthy, non-stressed corn.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: ______ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: The soil surface was dry. Data point is outside of area of depression where evidence of inundation is present.

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ No ☐

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-26		10YR2/1			Loam
26-33		10YR6/1			Clay silt

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☐ No ☒

Type:

- Cowardin:
- USFWS Circular 39:

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	7/16/02, 7/23/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

	Yes	No		
Do Normal Circumstances exist on the site?	☐	☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☒	☐	Transect ID:	
Is the area a potential Problem Area?	☐	☒	Plot ID:	D-1

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Phalaris arundinacea (1)	95	H	FACW+	9.				
2.	Salix exiguq (1)	<5	S	OBL	10.				
3.	Ulmus americana (2)	<5	T	FACW-	11.				
4.	Hypericum pyramidatum (2)	<5	H	FAC+	12.				
5.					13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks:
(1) Species found in bottom of drainageway or in lower portion of sideslopes.
(2) Species found in upper portion of sideslopes.

HYDROLOGY

☒ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☒ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☒ Inundated
- ☒ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☒ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: Data point taken in bottom of drainageway near toe of slope. Review of historical aerial photography and presence of 60" +/- culvert indicate that drainageway was previously excavated. No date of excavation has been determined. North end of culvert is located at north property line and extends south 20'.

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☐ No ☒

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-12		10YR4/2			Clay silt
12+		10YR5/2			Silty sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☒ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Soils appear to be depositional and fully saturated to surface. Saturated condition appears to be permanent.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☒	No ☐				
Wetland Hydrology Present?	Yes ☒	No ☐				
Hydric Soils Present?	Yes ☒	No ☐	Is this Sampling Point Within a Wetland?	Yes ☒	No ☐

Type:

- Cowardin: PEMCd
- USFWS Circular 39: Type 3

Remarks: Water in drainageway appears to be permanent since a minnow population water observed along with a frog.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	MMPA Power Generation Project – Faribault, MN	Date:	7/16/02, 7/23/02
Applicant/Owner:	Minnesota Municipal Power Agency	County:	Rice
Investigator:	ER Slattery	State:	Minnesota

Do Normal Circumstances exist on the site?	Yes ☐	No ☒	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	Yes ☒	No ☐	Transect ID:	
Is the area a potential Problem Area?	Yes ☐	No ☒	Plot ID:	D-2

(If needed, explain on reverse.)

VEGETATION

	Dominant Plant Species	% Cover	Stratum	Indicator		Dominant Plant Species	% Cover	Stratum	Indicator
1.	Ambrosia trifida	75	H	FAC+	9.				
2.	Cirsium aruense	10	H	FACU	10.				
3.	Urtica dioica	5	H	FAC+	11.				
4.	Lactuca scariola	<5	H	FAC	12.				
5.					13.				
6.					14.				
7.					15.				
8.					16.				

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-).

Remarks: Data point taken on top of bank.

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: ______ (in.)

Depth to Free Water in Pit: ______ (in.)

Depth to Saturated Soil: ______ (in.)

Wetland Hydrology Indicators:

Primary Indicators
- ☐ Inundated
- ☐ Saturated in Upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC-Neutral Test
- ☐ Other (Explain in Remarks

Remarks: Sufficient hydrology indicators are not present.

SOILS

Map Unit Name (Series and Phase):	Glencoe clay loam (Map Series 114)	Drainage Class:	Very poorly drained
Taxonomy (Subgroup):	Cumulic Endoaquolls	Field Observations Confirm Mapped Type?	Yes ☒ (1) No ☐ (1) >/ 20”

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contract	Texture, Concretions, Structure, etc.
0-20		10YR3/1			Dry sandy silt
20+		10YR2/1			Loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: It is likely that the soil, especially the top 20”, is overburden from excavation of the drainageway.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes ☒	No ☐
Wetland Hydrology Present?	Yes ☐	No ☒
Hydric Soils Present?	Yes ☒	No ☐

Is this Sampling Point Within a Wetland? Yes ☐ No ☒

Type:

- Cowardin:
- USFWS Circular 39:

Remarks:

Appendix B

Photographs

Photo 1: Looking north at Wetland A. I-35 right-of-way to left.

Photo 2: Looking east at Wetland A and location of Data Point Nos. A-1 and A-2.

Photo 3: Looking southwest at Wetland A.

Photo 4: Looking northeast at Wetland B. Sign marks Enron gas pipeline crossing.

Photo 5: Looking south at Wetland B and at location of Data Point Nos. B-1 and B-2.

Photo 6: Looking east at Wetland C.

Photo 7: Looking west at Wetland C and at location of Data Point Nos. C-1 and C-2.

Photo 8: Looking north at culvert located on north end of Wetland D. Data Point No. D-1 taken at bottom of drainageway in foreground.

Photo 9: Looking south at Wetland D. Photo taken from south end of culvert. Note – soybean field to east and cornfield to west. Data Point No. D-2 taken at top of bank to west.

Photo 10: Looking west near north property line. Drainageway (Wetland D); Wetland C and I-35 in background.

Photo 11: General site photo looking south along east side of site.

Photo 12: Looking northeast at Wetland D taken from a point southwest of the tree line near the midpoint of the drainageway.

Photo 13: Looking northwest at Wetland A taken from pipeline crossing at west property line. Note I-35 to the left.

Photo 14: Looking southeast along drainageway as it leaves Wetland A.

Photo 15: Looking west along drainageway downstream of Wetland A. Note I-35 in background.

Photo 16: Looking east at Wetland E and the drainage ditch (Wetland D) in the background.

Photo 17: Looking northeast at Wetland D. Photo taken from the southwest quadrant of the subject property. Note the soybean field up to the edge of the drainageway.

Photo 18: Looking northwest at Wetland D. Photo taken near west property line. Note soybean field up to edge of sandbar willow.

Photo 19: Looking west (upstream) at main drainageway near west property line.

Photo 20: Looking southwest at drainageway along west property line. Photo taken near the confluence with main drainageway.

Photo 21: Looking west with drainageway along the southern property line to the right. Photo taken from adjoining soybean field to the south of the south property line.

Appendix D

U.S. Fish & Wildlife Service Correspondance

Iowa City Files
16245/Regulatory Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Twin Cities Field Office
4101 East 80th Street
Bloomington, Minnesota 55425-1665

RECEIVED
STANLEY CONSULTANTS
AUG 12 2002
CIVIL/ARCHITECTURE

AUG - 8 2002

Ms. Karmen Heim
Civil Engineer
Stanley Consultants, Inc.
Stanley Building
225 Iowa Avenue
Muscatine, Iowa 52761

Dear Ms. Heim:

This responds to your letter dated July 24, 2002, requesting information on federally threatened (T) and endangered (E) species for a proposed 250 MW Combined Cycle Plant Project near Faribault in Rice County, Minnesota. The project site is located in T110N, R21W, Sec.13.

The prairie bush clover (*Lespedeza leptostachya*) (T), and Minnesota dwarf trout lily (*Erythronium propullans*) (E) are listed as federally threatened or endangered in Minnesota and documented to occur in Rice County. However, given the location and type of activity proposed, we have determined that the proposed project as described in your letter is not likely to adversely affect any federally listed or proposed threatened or endangered species or adversely modify their critical habitat. This precludes the need for further action on this project as required under section 7 of the Endangered Species Act of 1973, as amended. However, if the project is modified or new information becomes available which indicates that listed species may occur in the affected area, consultation with this office should be reinitiated.

We appreciate the opportunity to comment and look forward to working with you in the future. If you have questions regarding our comments, please call Mr. Gary Wege of my staff at (612) 725-3548, extension 207.

Sincerely,

Dan P. Stinnett
Field Supervisor

RECEIVED
S.E.I. CORALVILLE
AUG 13 2002
STANLEY CONSULTANTS GROUP